



Washington  
Department of  
**FISH and  
WILDLIFE**

## Drought Status Update #20

### July 31, 2015

Note: This material is intended for, and contains elements of special interest to, WDFW agency staff. Non-agency readers or anyone having questions about the context, clarity, or content for items in this update should contact the author, WDFW Drought Coordinator Teresa Scott at (360) 902-2713 [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov)

WDFW staff are scrambling at the return of very warm temperatures this week. Take comfort – temperatures should be back to normal soon. Following gets my vote for photo of the week, and is used here with permission from Andy W. We have a few empty raceways where fish should be, and that’s disappointing to visitors and staff, alike.



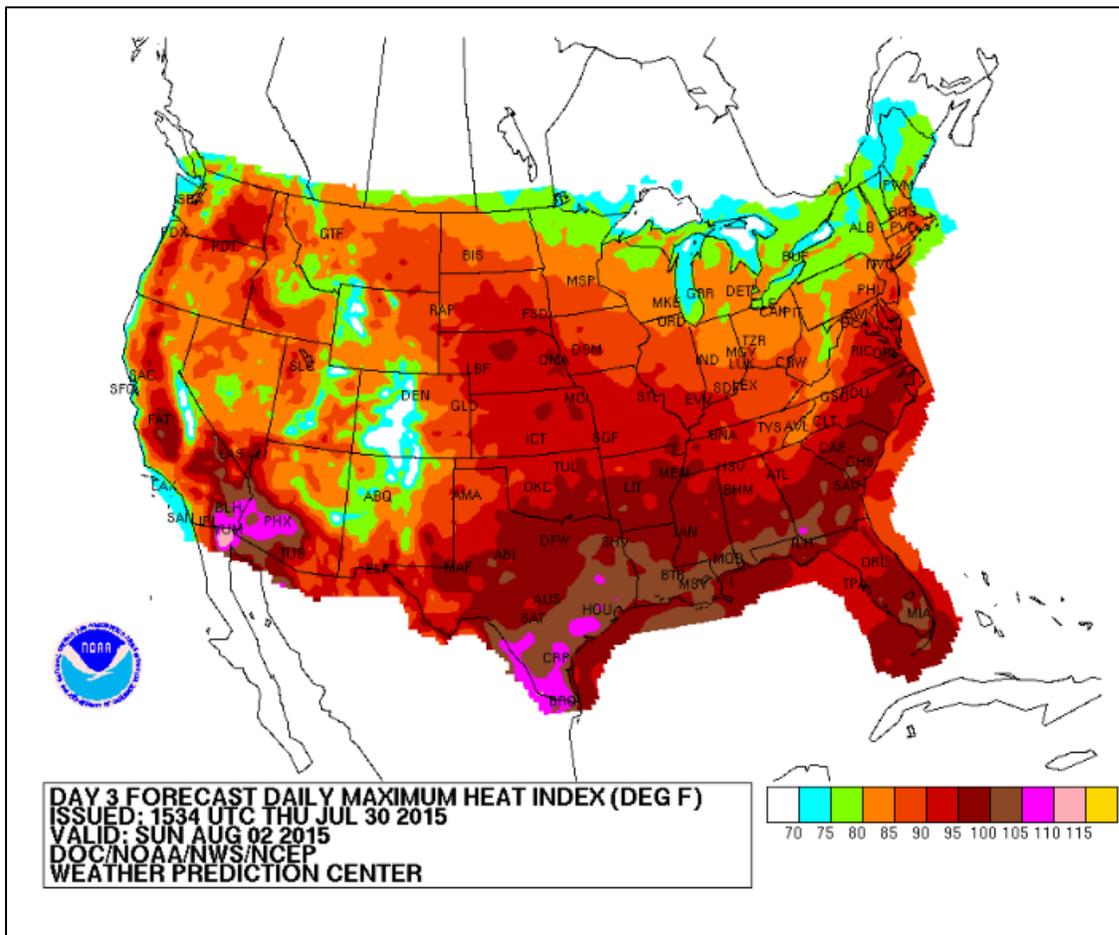
KIRAN WALGAMOTT PEERS INTO THE RACEWAYS AT THE WALLACE SALMON HATCHERY NEAR GOLD BAR. THE FACILITY REARS COHO, SUMMER CHINOOK AND STEELHEAD.  
(ANDY WALGAMOTT)

This week, video reports feature a drought [project on the Sol Duc River](#) with Rob Allen, and a report with great messaging about [recreational rock dams](#) by Region 4’s Sgt. Kim Chandler. Well done!

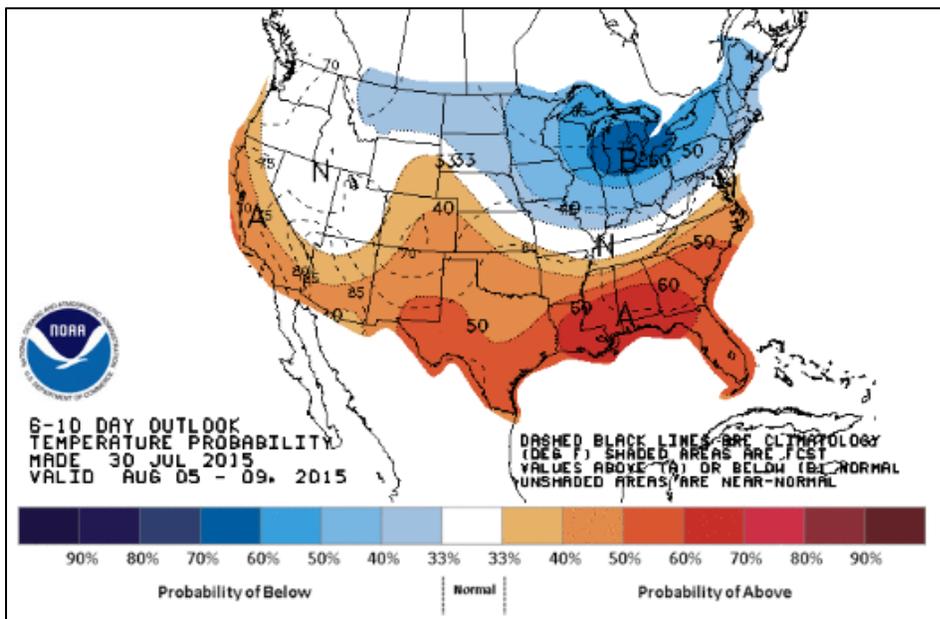
Check out the [weekly update by the Office of the State Climatologist](#), which summarizes conditions and climate milestones to-date.

### ***Temperature Forecasts***

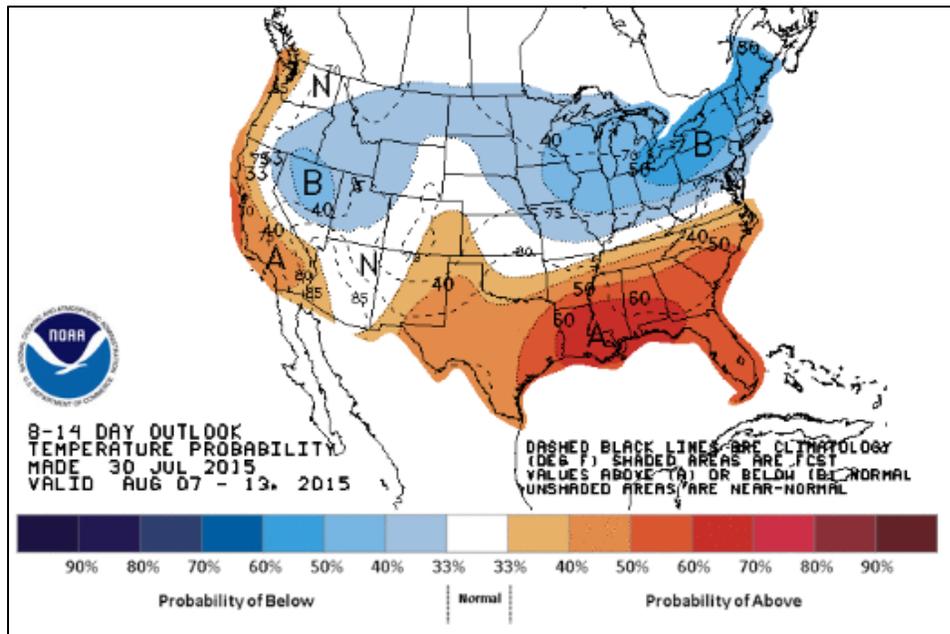
Let’s mix it up and start with temperature forecasts. We are experiencing some high temperatures right now, and these moderate (hard to believe) through the weekend. Below is the “[Maximum Heat Index](#)” (in degrees F) for Seafair Sunday, August 2<sup>nd</sup>, as forecast July 30. Temperatures in Washington gradually decline from these levels. Daily weather forecast maps are [available from NWS](#) that show maximum temperature and other useful tools.



The 6-10 day outlook shows the forecaster's confidence (probability) that the observed temperature (averaged over upcoming days 6, 7, 8, 9 and 10) will be in the range of one of three possible categories - below (B), normal (N), or above (A) (based on the 30-year climatology record of 1981-2010). The 6-10 day temperature outlook (below) is for NORMAL temperatures in Washington starting 8/5 through 8/9.

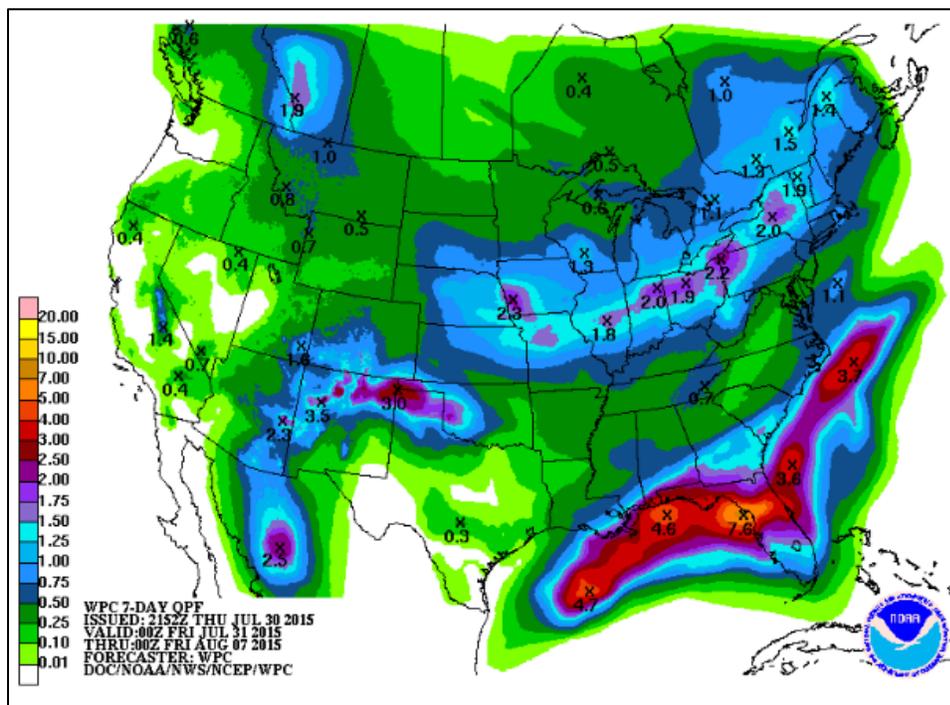


Temperatures for the 8-to-14 day period (below) turn toward higher-than-normal in western Washington, but stay in the “Normal” range elsewhere.

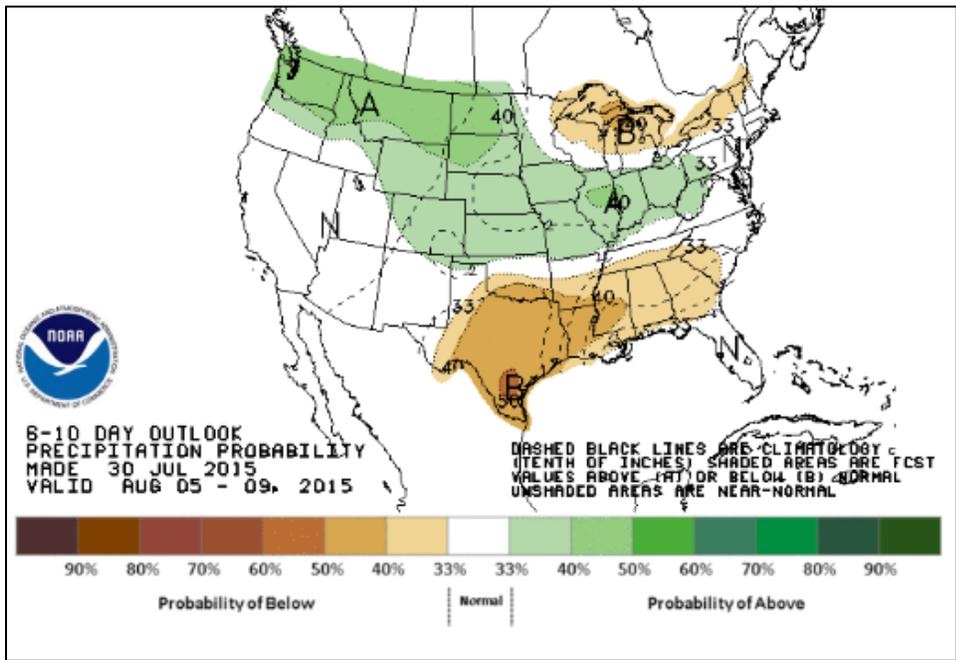


### Precipitation Forecasts

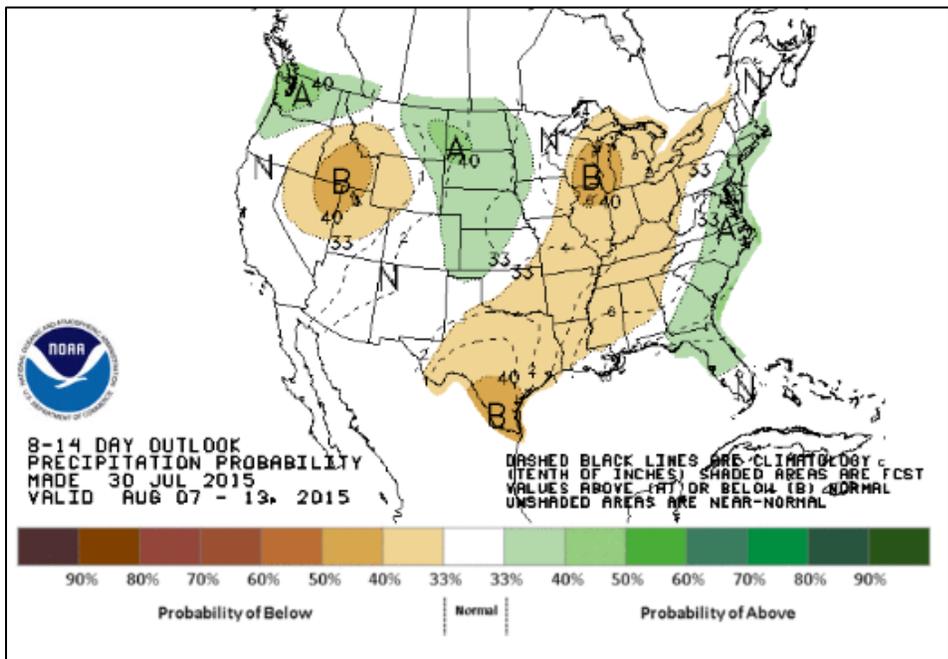
At least trace [precipitation](#) is expected everywhere except southwest and south central Washington during the next seven days (below). This weekend, chances for precipitation are nil, so that means what little precipitation we’ll get will occur next week and beyond. Remember, a high probability for above-normal precipitation in Washington in August is still not very wet.



The 6-to-10 day probability of precipitation (8/5-8/9) is greater than normal throughout Washington (below).



And below is the 8-to-14-day outlook, which shows higher-than normal precipitation (which still isn't much) throughout most of Washington.

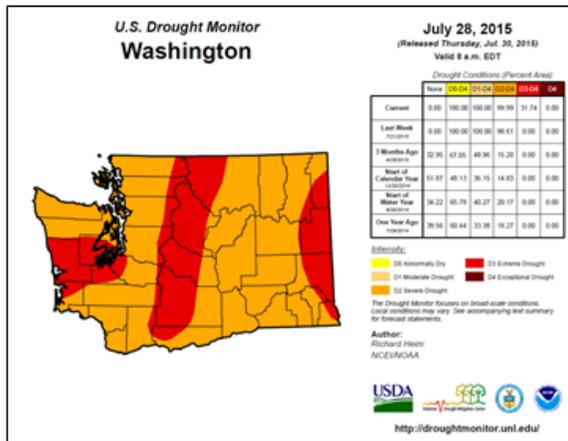


### ***Federal Drought Status***

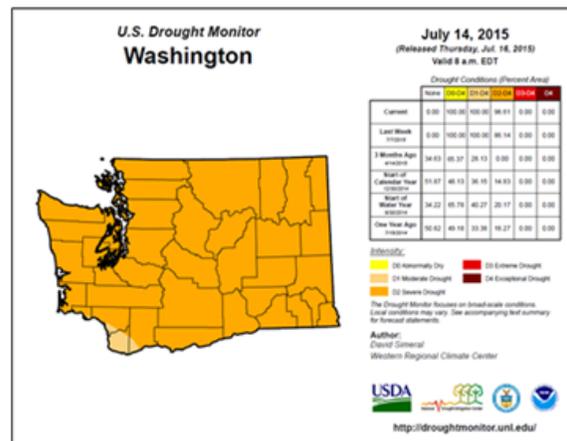
The optimistic viewpoint from two weeks ago (“things can get worse”) is borne out in this week’s drought monitor report. One-hundred percent of the state falls under some sort of federal drought status, with most of the state under the “D2” Severe Drought classification and an amazing 32% listed as D3 - Extreme Drought this week! The [U.S. Drought Portal](http://www.usdroughtportal.gov) provides the

weekly drought status for the nation (below). A USDA Secretarial disaster designation makes farm operators in designated counties eligible to be considered for certain assistance from the Farm Service Agency. I've lost track of FSA disaster status; check it out at the [USDA Disaster Assistance](#) web page.

This week:



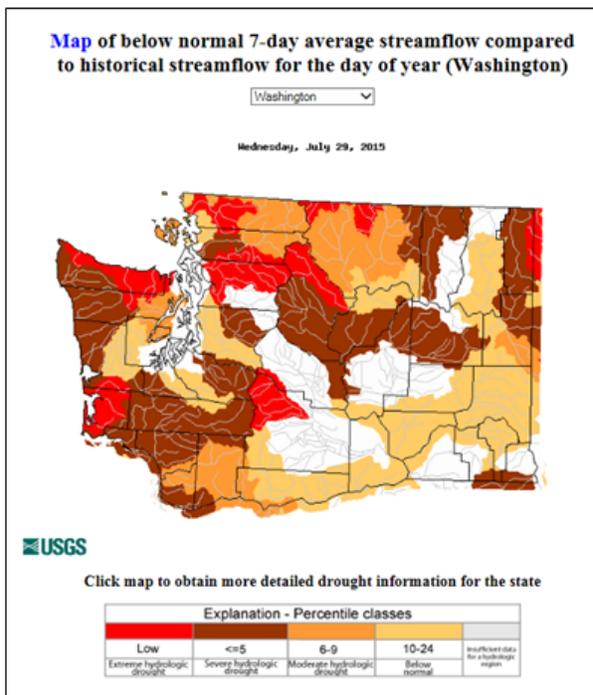
Two weeks ago:



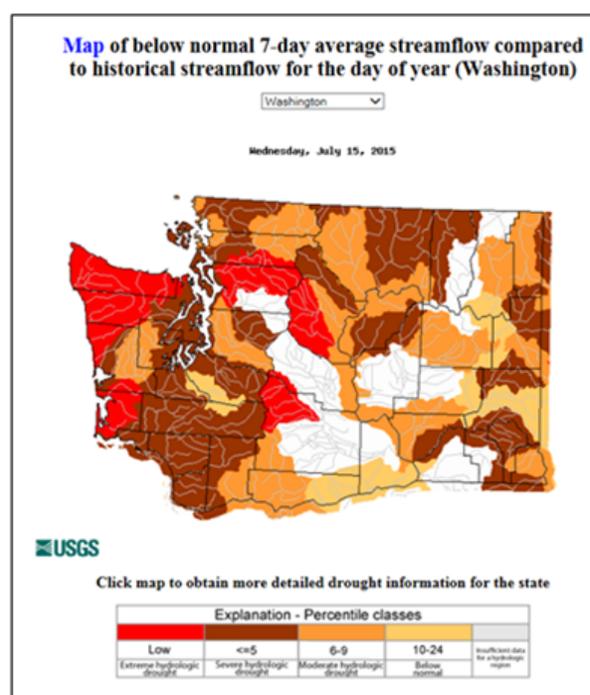
## Stream Flows

For the state as a whole, the figure showing [stream gauges with below normal streamflow](#) for 7 days or more is a mixed bag compared to previous weeks. Olympic coastal streams appear in marginally better condition; many eastern Washington areas have gone from bad to worse. The white areas are places with insufficient information.

This week (July 29)



2 weeks ago (July 15)



## Hydrograph Sampler

Hydrograph Sampler Charts are integrated into the impacts narrative; see the end of this document for links to our favorite sites. I would love to hear others' interpretations of these charts – to me (a notorious pessimist), flows look like they are settling into the base flows typically seen in August and September. Are you a pessimist or an optimist?

### Selected Washington Streamflows Table

The table gives a quick visual reference for daily flows as a percent of normal for this date in the historic record. The first column shows the gauge location, the second column shows today's stream flow readings, the third column shows today's flows as a percentage of average flows for this date throughout the period of record, column four shows the (previous) minimum flow for this date, and the fifth column shows in what year that minimum occurred.

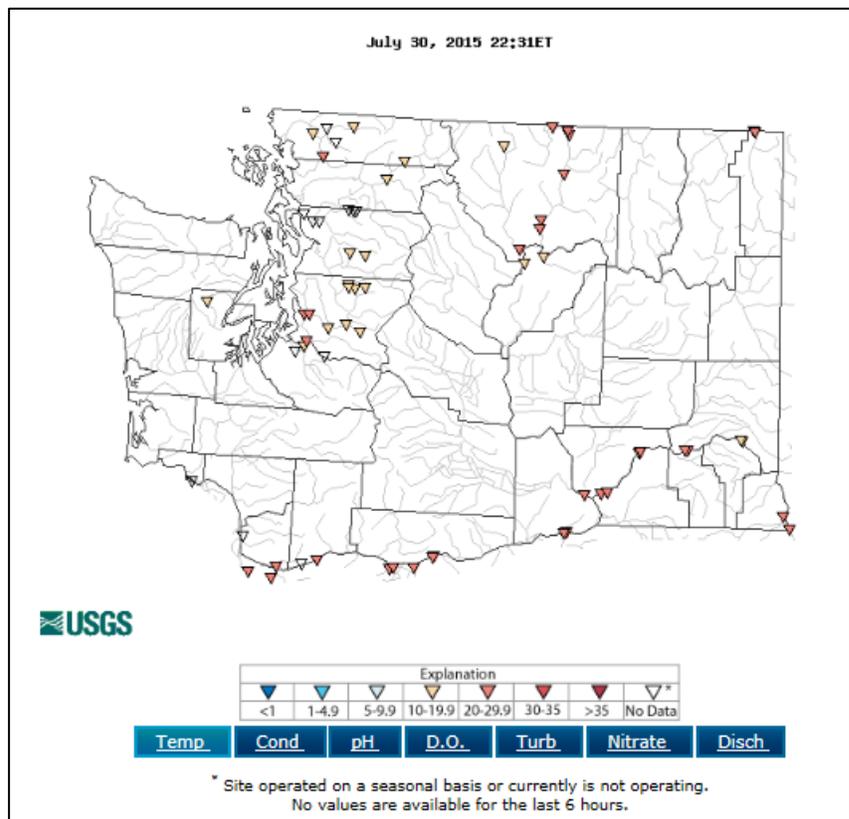
Nineteen of our select set of 43 locations set record lows on July 30, 2015. Low flow records are occurring marginally less frequently as we move into the traditional low-flow periods for Washington streams. [Statewide streamflows](#) are available from USGS.

Selected Streamflow Gauges	Today's Flow (cfs)	Percent of average for this date in the record	Min Flow (cfs)	Min Yr
MF NOOKSACK RIVER NEAR DEMING, WA	281	67%	220	1969
NOOKSACK RIVER AT FERNDALE, WA	1,310	47%	1,590	1992
SKAGIT RIVER NEAR CONCRETE, WA	8,190	55%	6,300	1941
SAUK RIVER AT DARRINGTON, WA	514	34%	533	1926
CASCADE RIVER AT MARBLEMOUNT, WA	414	31%	787	2006
NF STILLAGUAMISH RIVER NEAR ARLINGTON, WA	197	33%	220	1938
SNOQUALMIE RIVER NEAR CARNATION, WA	498	32%	555	1930
SKYKOMISH RIVER NEAR GOLD BAR, WA	412	19%	672	1992
ISSAQUAH CREEK NEAR MOUTH NEAR ISSAQUAH, WA	21	64%	14	2004
CEDAR RIVER BELOW DIVERSION NEAR LANDSBURG, WA	113	63%	97	1992
CEDAR RIVER AT RENTON, WA	126	59%	41	1958
BIG SOOS CREEK ABOVE HATCHERY NEAR AUBURN, WA	23	62%	22	1985
GREEN RIVER NEAR AUBURN, WA	258	70%	228	1994
SOUTH PRAIRIE CREEK AT SOUTH PRAIRIE, WA	30	43%	33	2003
PUYALLUP RIVER AT PUYALLUP, WA	1,230	47%	1,460	1985
NISQUALLY RIVER AT MCKENNA, WA	544		55	1959
DESCHUTES RIVER NEAR RAINIER, WA	28	64%	23	2003
NF SKOKOMISH R BL STAIRCASE RPDS NR HOODSPORT, WA	41	18%	59	1926
DUNGENESS RIVER NEAR SEQUIM, WA	106	28%	132	1926
HOKO RIVER NEAR SEKIU, WA	12	27%	16	1992
CALAWAH RIVER NEAR FORKS, WA	54	38%	60	2009
HOH RIVER AT US HIGHWAY 101 NEAR FORKS, WA	686	47%	895	1992

SATSOP RIVER NEAR SATSOP, WA	204	56%	252	1958
CHEHALIS RIVER NEAR GRAND MOUND, WA	140	51%	128	1965
NASELLE RIVER NEAR NASELLE, WA	19	34%	27	1992
COWLITZ RIVER BELOW MAYFIELD DAM, WA	6,220		1,500	1968
COWLITZ RIVER AT PACKWOOD, WA	528	43%	450	1992
LEWIS RIVER AT ARIEL, WA	1,270	84%	124	1931
WHITE SALMON RIVER NEAR UNDERWOOD, WA	521	67%	326	1944
KLICKITAT RIVER ABOVE WEST FORK NEAR GLENWOOD, WA	71	38%	73	1992
WALLA WALLA RIVER NEAR TOUCHET, WA	9	47%	0	1968
TUCANNON RIVER NEAR STARBUCK, WA	46	71%	18	1931
GRANDE RONDE RIVER AT TROY, OR	465	44%	448	1977
YAKIMA RIVER AT KIONA, WA	2,440		555	1994
AMERICAN RIVER NEAR NILE, WA	32	20%	47	1941
CRAB CREEK AT IRBY, WA	1	9%	1	1973
WENATCHEE RIVER AT PLAIN, WA	444	21%	534	1941
METHOW RIVER NEAR PATEROS, WA	371	32%	345	1977
OKANOGAN RIVER AT MALOTT, WA	674	28%	472	1977
OKANOGAN RIVER AT OROVILLE, WA	173	24%	70	1947
SPOKANE RIVER AT SPOKANE, WA	750	34%	681	1973
COLVILLE RIVER AT KETTLE FALLS, WA	37	34%	10	1931
PEND OREILLE RIVER BELOW BOX CANYON NEAR IONE, WA	6,960	40%	7,260	1994

## Real-Time Water Temperature from USGS and Ecology

[USGS Real Time temperature stations in Washington](#) are not as numerous as their streamflow cousins, but are still helpful to stream watchers and fish managers (right). Temperatures above 20 degrees C are still occurring along the mainstem Columbia and Snake Rivers and the Okanogan River. In western Washington this week, the lower SF Nooksack River at Saxon Bridge records at 21.3 degrees C; the Nooksack at North Cedarville is 19.0. Lower reaches of the Cedar, Duwamish, and White Rivers continue to exceed 20 degrees C. WDFW is working with USGS to prioritize additional real time stations for temperature



monitoring, so if you have favorites, let me know. WDFW are also placing temperature data loggers at locations throughout Washington; these are purchased using state drought funds and will help all agencies understand temperature stresses during these extreme conditions.

Ecology's [Flow Monitoring Network](#) provides air and water temperature monitoring at several Ecology and co-op stations. There are a number of stations of interest, so follow the link and check it out. Data for the Lake Washington Ship Canal can be found [here](#). Temperatures at the Fish Ladder ranged from 65 to 71 degrees F this week.

**Reminder: Reporting temperature-related die-offs:** For reporting purposes, die-offs with obvious natural (drought-related) causes can be reported through WDFW internal methods. But if there is no obvious natural cause (or the natural cause is obviously not drought-related), we need to be aware of the potential for hazardous material contamination and report such incidents through the Environmental Response Tracking System maintained by Ecology. The correct ERTS reporting mechanisms are identified on the [Ecology ERTS web page](#).

## ***Drought Impacts to Fish and Wildlife***

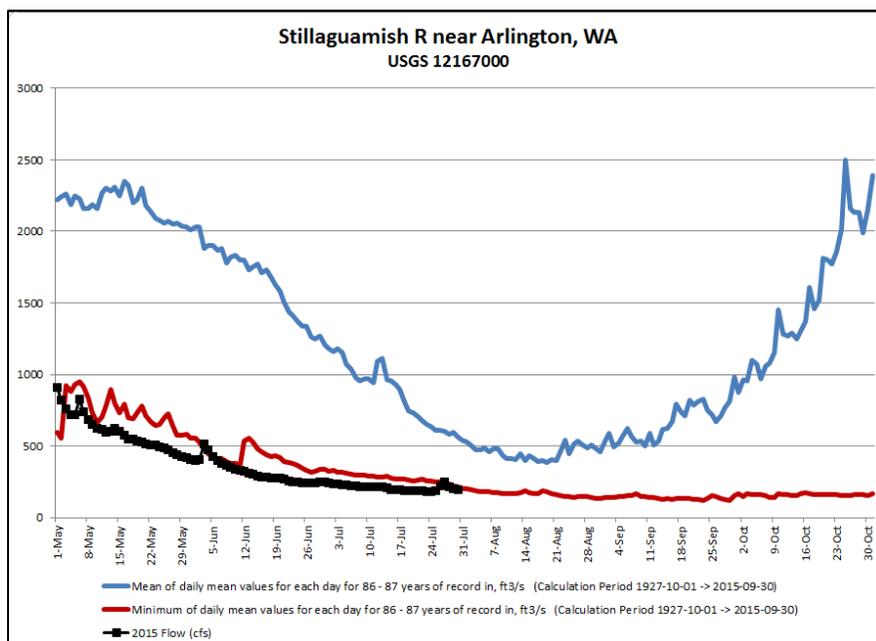
Water temperatures remain a top concern for fish and wildlife workers and watchers this week this week.

## **Skagit River FERC Project 533-005**

Since incubation flows are no longer necessary in the Skagit because the fry have emerged, the Flow Coordinating Committee on July 22 approved a reduction in outflows that are lower than the license minimums. Seattle City Light can drop their flows 1000 cfs to save water in their reservoirs and reverse the declining trend in reservoir elevation. As of July 31, Seattle City Light will drop Skagit project outflows from 3,250 to 2,250 cfs at Newhalem. (Brock Applegate)

## **Stillaguamish**

Stillaguamish looks just about as expected for unregulated streams in this neighborhood.



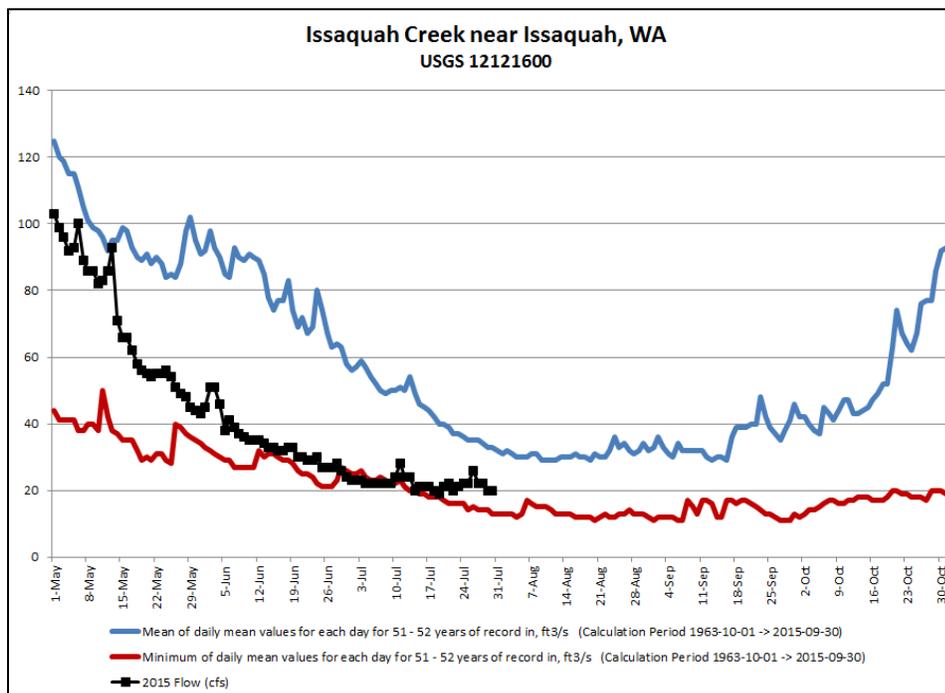
My apologies to Jody, who knows who he is, even if I don't. Keep that water temp data coming! Hope to meet you at some point!

## Sultan – Jackson Hydro

Snohomish PUD and the Aquatic Resources Committee (ARC) decided to move beyond the Stage 1 Drought Alert of lowering the minimum instream flows by 50 cfs. The ARC concurred with the proposal to decrease flows by 100 cfs, which SnoPUD would usually implement during a Stage 2 Drought Alert. In an effort to save water for late summer and fall, the ARC approved the larger minimum instream flow reduction of 300 cfs at the powerhouse to 200 cfs. With no incubating redds or adult salmonids migrating upstream, WDFW and the Services proposed and supported the move to decrease flows sooner. SnoPUD will slowly decrease flows at night to reduce the ramping impacts to any rearing fish. (Brock Applegate)

## Lake Washington/Cedar

Issaquah Creek continues with above-expected flows. Conditions at the hatchery are holding – or were before the heat wave.



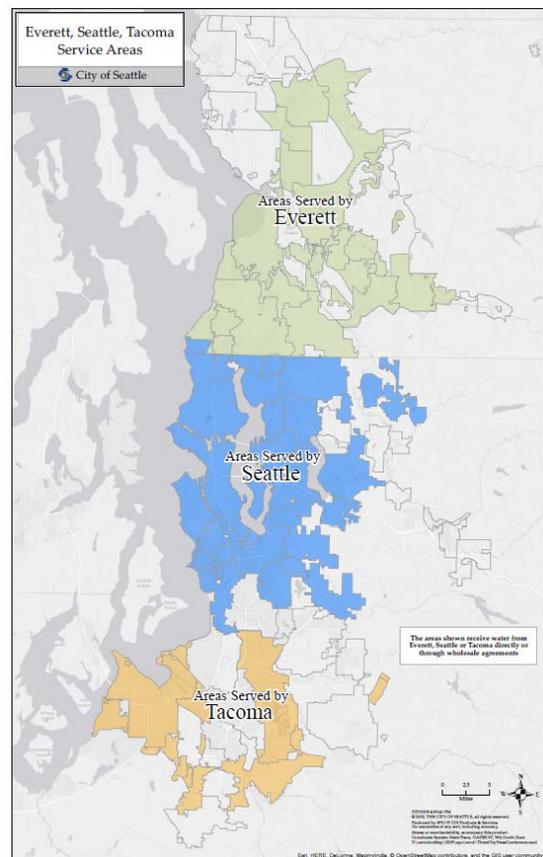
## King County Flow and Temperature Conditions

Following are excerpts from correspondents Curtis DeGasperi and Jim Simmonds from King County Department of Natural Resources and Parks. King County presents weekly summaries on King County river and creek flow and temperatures. Request data and/or get on Jim's distribution list at [Jim.Simmonds@kingcounty.gov](mailto:Jim.Simmonds@kingcounty.gov)

On Monday, July 27, Seattle, Tacoma and Everett jointly activated their water shortage response plans. Seattle Public Utilities has activated its Water Shortage Contingency Plan and entered into the "advisory" phase; click here for more information from Seattle Public Utilities. At right is a map of service areas affected.

## FLOW AND TEMPERATURE STATUS

- 10 out of 14 rivers and 8 out of 22 creeks with over 15 years of flow data and real-time data delivery had the lowest flows ever recorded for the week.
- With more typical air temperatures last week, only 1 out of 13 rivers/streams with over 15 years of temperature data and real-time data delivery had the highest temperatures ever recorded for the week, though all 9 out of 13 were higher than typical for the week. Maximum daily temperatures in the Cedar River (below the reservoir and at Renton), Little Soos, and Bear Creek were between 20 degrees C and 23 degrees C. Maximum daily temperatures in the Sammamish River reached 26.5 degrees C.
- Lake Washington water levels are the second lowest ever recorded for the week based on U.S. Army Corps of Engineer records that go back to 1940, above the 1958 minimum. Temperature data at the fish ladder at the locks were the highest for the week since record-keeping began in 2004.



## ECOLOGICAL IMPACTS

- Low flows and high temperatures may hinder adult salmon from reaching upstream spawning grounds. Temperatures above 20 to 21 degrees C are generally considered to be a migratory barrier to migration. Pink salmon in Alaska have shown increased mortality above 17 degrees C combined with lower than typical dissolved oxygen. Temperatures between 20 degrees C and 23 degrees C can cause thermal stress to many salmonids and increase disease outbreaks and infection, while temperatures above 23 degrees C can cause substantial health impacts or mortality to many salmonids. Low flows also decrease available wetted habitat for spawning and rearing, limit food availability, and increase predation.
- Washington Department of Fish and Wildlife is encouraging people to submit reports of suspected blockages or distressed fish or wildlife to <http://dfw.wa.gov/conservation/drought/reporting/>.
- As of July 21, only about 27,500 sockeye salmon had passed the locks and entered the Lake Washington system, substantially fewer than the preseason forecast of 150,000. Starting in mid-August, over 600,000 pink salmon are projected to return to the Green/Duwamish and over 1.6 million pink salmon are projected to return to the Snohomish River. Summer/fall Chinook will also start returning to local rivers in August, with preseason forecasts of about 7,400, 3,400, and 12,000 Chinook returning to the Snohomish River, Lake Washington, and Green River, respectively.

## REGULATORY AND LEGAL CONSIDERATIONS

- Flow in the Snoqualmie River is lower than the minimum instream flow established by Washington Administrative Code, which allows the state to curtail withdrawals by holders of junior water rights.
- Flows in the Green River are higher than instream flows required during drought years for Tacoma Public Utilities to withdraw water from the Green River using its primary water right claim under

agreements with the Muckleshoot Tribe, but are below the minimum instream flow established by Washington Administrative Code for Tacoma Public Utilities to withdraw water from the Green River with its second diversion water right.

- Flows in the Cedar River are higher than the normal minimum flow required by the Habitat Conservation Plan to be maintained by Seattle Public Utilities during normal years.

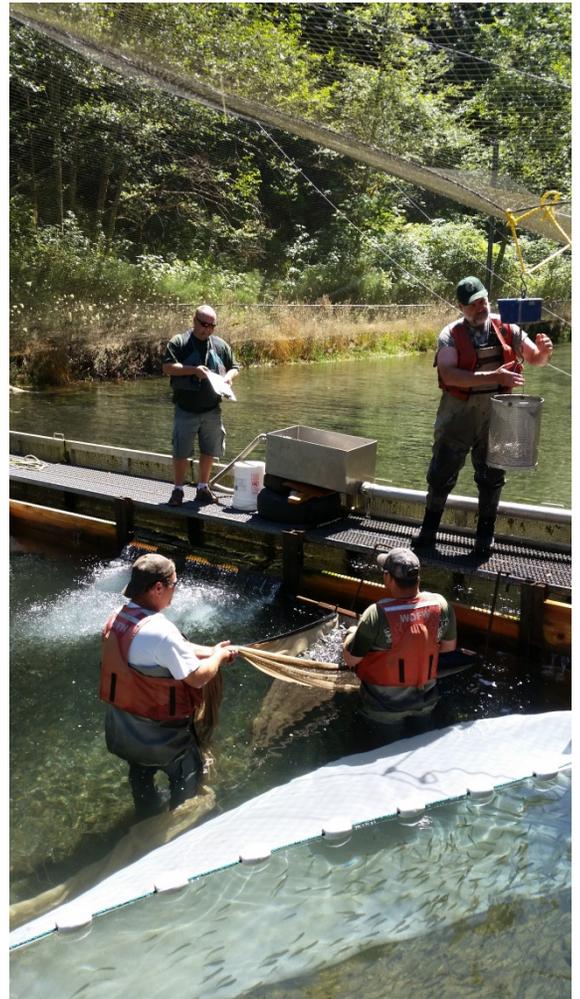
Flow and temperatures summary tables and figures are available from Jim, or let me know and I will forward Jim's report to you. Many thanks to Jim and Curtis for sharing this information with us!

## Green River

**Icy Creek Rearing Pond:** Icy Creek pond is a remote rearing ponds with no power on-site. 107,000 Chinook, or 30% of the Chinook population, were release July 29 from the Icy Creek facility. The facility has lost 3200 gallons per minute of flow, from a starting point of around 5000 gpm three weeks ago. Currently fish are healthy, all adipose clipped, and at 60 fish per pound in size. Normally they would be released beginning next April 15 at 10 fish per pound.

The rapid decrease in water available at the facility is a huge concern for WDFW. Normally flows are at the lowest point in October. Last year, which was a more favorable water year, water flows hit a low point of around 400 gallons per minute. We are anticipating lower flows, and for a longer duration, this summer. Prolonged periods of low flows exacerbate stress levels of fish in the pond, and can increase the prevalence of Bacterial Kidney Disease (BKD) in the population.

Water temperatures are currently good in the ponds at Icy, in the low fifties. Water temperatures in the mainstem Green in the vicinity of Icy Creek have been in the high fifties to the low 60's. This is a good time to release fish from the pond; we expect a survival rate similar to our normal sub-yearling Chinook release groups out of Soos Creek. If WDFW did not release these fish now, rapidly increasing densities (from fast-growing fish) in the ponds, coupled with rapidly decreasing water supply and the potential temperature differences between spring water and river water, survival rates for all fish would be lower. (Brodie Antipa)



**Tacoma Power & Water:** Flows on the Green River at Auburn will be unlikely to dip below 250 cfs for the rest of the summer/fall period. Tacoma has the ability to go below 250 cfs to 225 cfs depending on the severity of the drought. Before dropping below 250 cfs the utility must consult with all stakeholders, explore other alternative sources of water and partially curtail

their First Diversion. Tacoma must convene a drought coordination meeting 30 days before reducing the flows below 250 cfs. No such meeting had been scheduled as of press time. There is a reserved block of water for fish that will be allocated this fall. It won't bring up the flows very much: Flows at Auburn may reach 300 to 400 cfs in September to encourage chinook upstream migration and spawning. After that we will hope for rain, or flows might be back to 250 cfs. In past years, there has been enough water to keep Green River chinook redds wet; this year's conditions will reveal themselves in the fullness of time – stay tuned (Peggy Miller).

## Nisqually River (FERC# 1862)

The Nisqually River Coordinating Committee agreed on July 21 to the following changes in Nisqually Project operations:

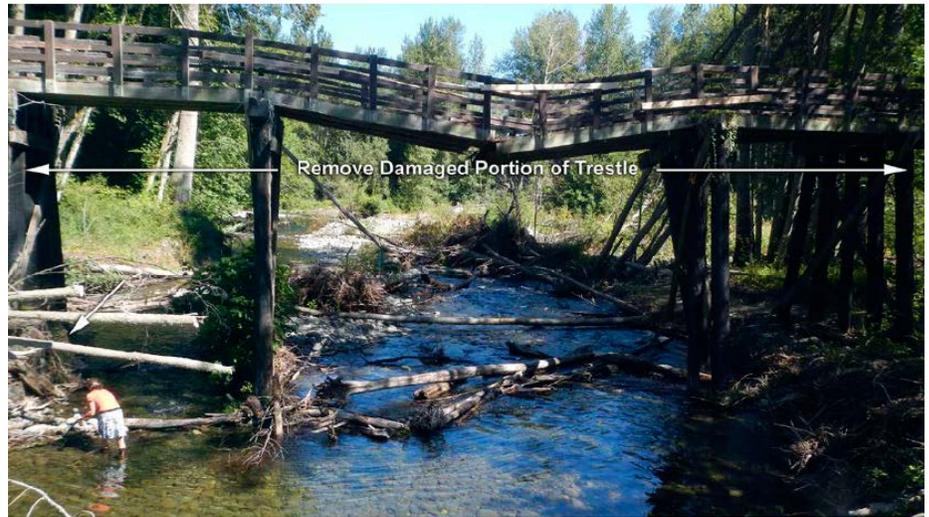
- Adjust the flow from 980 to 850 cfs beginning at 3 am July 22, 2015 using a 1 inch per hour ramp rate according to the LaGrande Powerhouse USGS gage (12086500).
- Make a second adjustment from 850 to 700 cfs beginning at 3 am July 23, 2015 using a 1 inch per hour ramp rate according to the LaGrande Powerhouse USGS gage (12086500).
- Make a third adjustment from 700 cfs to 650 cfs beginning at 3 am August 1, 2015 using a 1 inch per hour ramp rate according to the LaGrande Powerhouse USGS gage (12086500).
- Minimum flows in the Nisqually River through the Centralia canal by-pass reach will be 500 cfs through July and 370 cfs through August according to the USGS McKenna gage (12089500). The Nisqually Coordination Committee understands that 0 cfs flow will be diverted from the river into its canal by Centralia during September. This action is to be taken to address temperature concerns in the bypass reach that likely would delay upstream migration of Chinook and pink salmon.

The Nisqually River Coordination Committee will meet weekly via conference call beginning August 6, 2015 to review new information and contemplate further adjusts to the flow regime.

Alder Lake water temperatures reach 18 degrees C at about 60-foot depth in Alder, and varies somewhat by location within the reservoir; 20 degrees C is reached at able 30 feet depth. Minimum pool (1114 ft reservoir elevation) is at about 65 ft from the surface elevation, outflow to generators is about 100 ft below minimum pool. Drawing water temperatures from about 165 ft from surface elevation. Currently must generate to pass inflows, generator damage may occur if generate when elevations are below 1114 ft. There is a bypass valve but it's not been used recently so Tacoma Power doesn't know how much sediment is located around the valve. Use of the valve will be investigated once we get closer to the minimum pool. (Peggy Miller with Larry Phillips, James Losse, Doug Wiedemeier, and Darric Lowery)

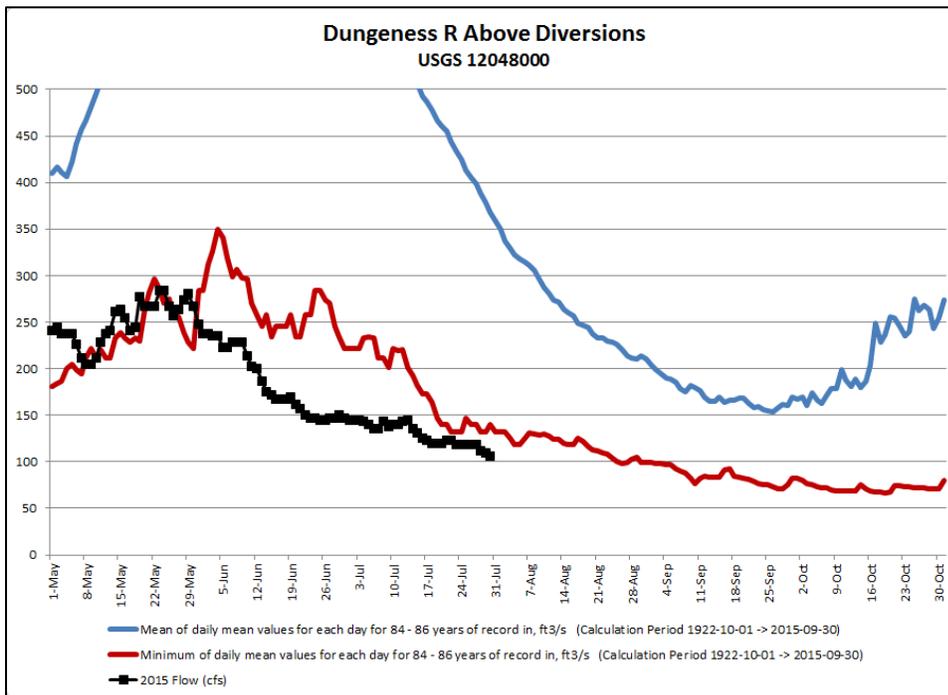
## Dungeness

This weekend the Jamestown s’Klallam Tribe will be removing a short section of the Dungeness River trestle where it crosses the new channel that formed last winter. In February, 2015 the Dungeness River Trestle was damaged by flooding. The trestle supports the Olympic Discovery Trail where it crosses the River, and the flood damage caused the Trail to be closed. Since that time,



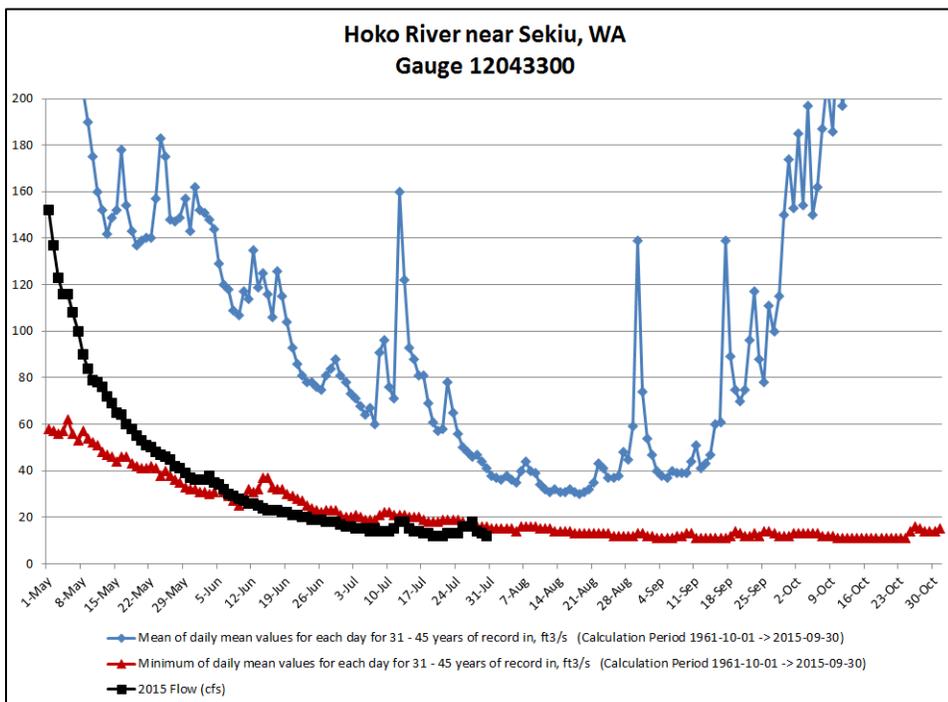
the Jamestown S’Klallam Tribe and numerous stakeholders have collaborated to design and fund a trestle replacement project. Construction is scheduled to begin near the end of August. Meanwhile, Chinook and pink salmon have begun migrating up the Dungeness River and will begin spawning soon. The damaged portion of the trestle (photo) is located in the River on tribal land near potential spawning sites. To avoid conflicts with spawning salmon, it is essential that this portion of the trestle be removed before spawning begins. The Tribe will perform this work on August 1st and intends to complete the project by August 2nd. (Randy Johnson, Jamestown s’Klallam; Chris Byrnes, WDFW; and numerous stakeholders)

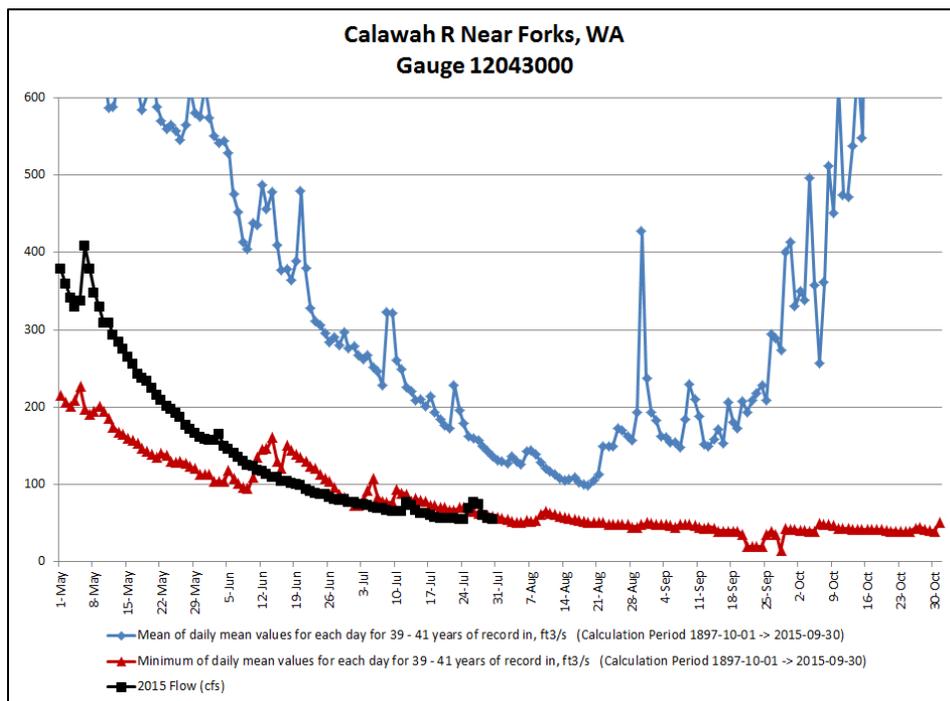
There are a lot of pink salmon in the lower Dungeness, and almost all of the major pools have fish in them. No pinks in the Graywolf, though. A few steelhead and chinook. Pinks are passing fairly easily but chinook might be having a harder time. Fish are congregating at major diversions and headgates, which is not ideal. Water Temperature at Dungeness Meadows is over 16 degrees C. (Chris Burns, Jamestown s’Klallam Tribe –Dungeness Drought Team). Dungeness is in poor flow condition but the drop will be slowing with the reductions in irrigation.



City of Port Angeles Water Supply (wells near the Elwha River) downgraded to drought condition stage 3 conservation this week; see Newslinks for more info

Hoko and Calawah are looking similar, and appear to be in better shape than last year at this time, which isn't saying much. Check out the [video coverage of Rob Allen and crew](#) working to concentrate flows for fish passage in the Sol Duc.





## Chehalis Basin

After one of the driest starts to summer on record, this year's drought has dramatically reduced river and stream flows in western Washington. As a result, the Washington Department of Ecology has issued curtailment orders to 93 water rights holders in the Chehalis River basin.

Following early warning letters sent July 21, property owners in the upper and lower Chehalis River basins are now being sent curtailment orders if their water rights are impacted by the low flows. The orders prohibit diversions of water for irrigation purposes from the Chehalis River and its tributaries when flows are below the minimums set by the 1976 water management rule.

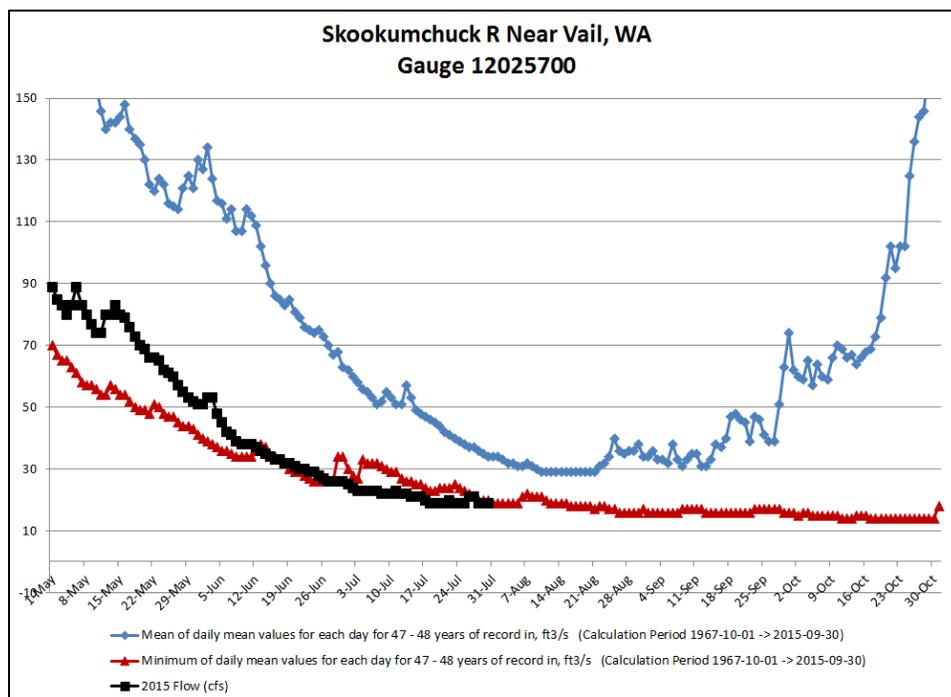
Before diverting water from the Chehalis River, water rights holders who received the orders must now call Ecology's hotline first to find out if there's enough water in the river to do so. If river levels at specific gauges associated with their water rights are below the minimum level, those property owners are prohibited from withdrawing water. For more information see:

[Ecology News Release](#) - July 30, 2015

### Skookumchuck: (FERC #4441)

The Skookumchuck fish operations group came to an agreement on reducing flows to 100 cfs starting September 1<sup>st</sup> to October 31<sup>st</sup>. Right now flows are "inflows + 50 cfs." So flows will increase in September but not as much as the agreement (140 cfs). The complication is the FERC requirement that reservoir elevation stay above 420 ft before October 31<sup>st</sup>. Hatchery staff have indicated that water temperatures will be cool enough for the hatchery. TransAlta was requested to provide WDFW with weekly updates on flows, temperature and reservoir elevation. Stay tuned. (Peggy Miller, with Mike Scharpf, Steve Thiesfeld, Theresa Nation, and Randy Aho)

Flows in the figure below represent inflow to the Skookumchuck Reservoir. Records low flows are obviously even worse than last year.



### Wynoochee Dam (FERC# 6842):

Tacoma Power believes there is enough water available behind Wynoochee Dam to provide 190 cfs minimum flows. The water behind the dam is becoming increasingly warm. The FERC License provides a temperature objective range of 50 – 58 degrees Fahrenheit (F) with an optimal discharge of 55 F. The Wynoochee Fisheries Technical Committee recommended increasing the upper range of the outflow temperature objective to 16 C (60.8 F), consistent with the Washington State surface water criteria of core summer salmonid habitat, during the period July 15, 2015 to December 31, 2015. A *Proposed Decision or Consideration* section of Wynoochee Decision Document 2015H is amended FERC License Article 403 wording consistent with the group’s discussion. The only proposed changes are to the upper limit and the timeframe. The group did not review the issue of changing the lower limit of the temperature band.

WDFW is concerned that not enough cool water will be available for fall migration and spawning. And if temperatures at the dam are increased too much, the Lake Aberdeen hatchery suffers because there is a 10° F difference between the water temps released from the dam and water temps at the diversion for Lake Aberdeen. WDFW concurred with the Wynoochee Reservoir Discharge Decision Document with the understanding that this is an adaptive process and we may need to deviate from 55°C optimal temperature this fall – hopefully not by much (Peggy Miller with Mike Scharpf, Steve Thiesfeld, and Randy Aho).

The document says Tacoma Power will:

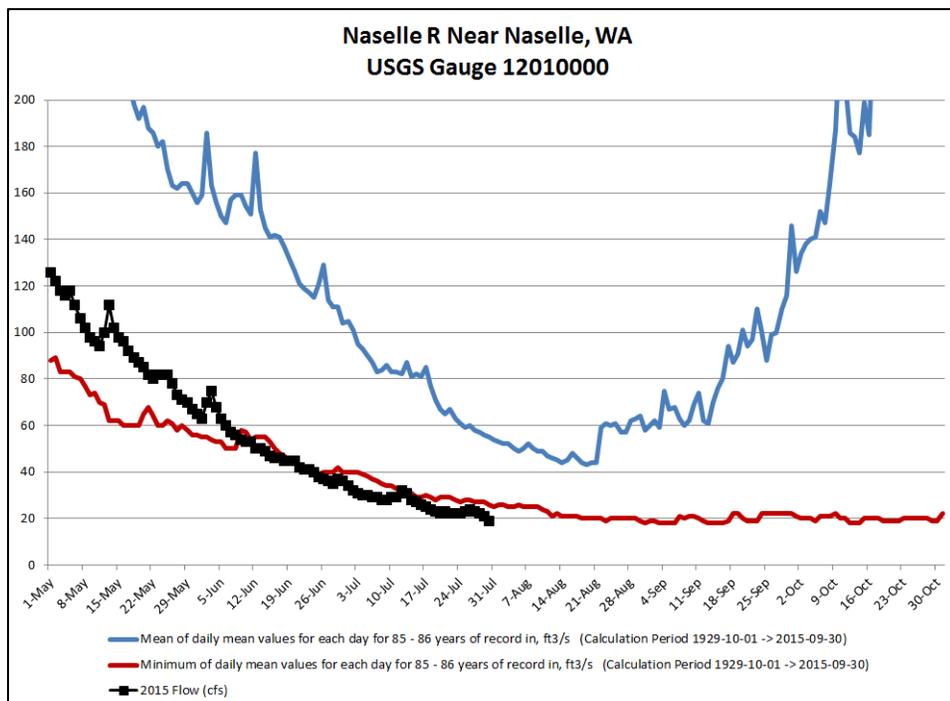
- 1) Continue discharging water at a minimum of 190 cubic feet per second (cfs) from Wynoochee Dam.

- 2) Increase the upper threshold of the discharge water temperature band from 58 to 60.8 degrees Fahrenheit until December 31, 2015.
- 3) Manage low flow gates to achieve the optimal discharge water temperature of 55 degrees Fahrenheit.
- 4) Provide multi-elevation reservoir water temperature and discharge water temperature data to the Wynoochee Fisheries Technical Committee (WFTC) members on a bi-weekly (every two weeks) basis.
- 5) Provide updated Wynoochee reservoir elevation probability curves to the WFTC members on a bi-weekly basis.

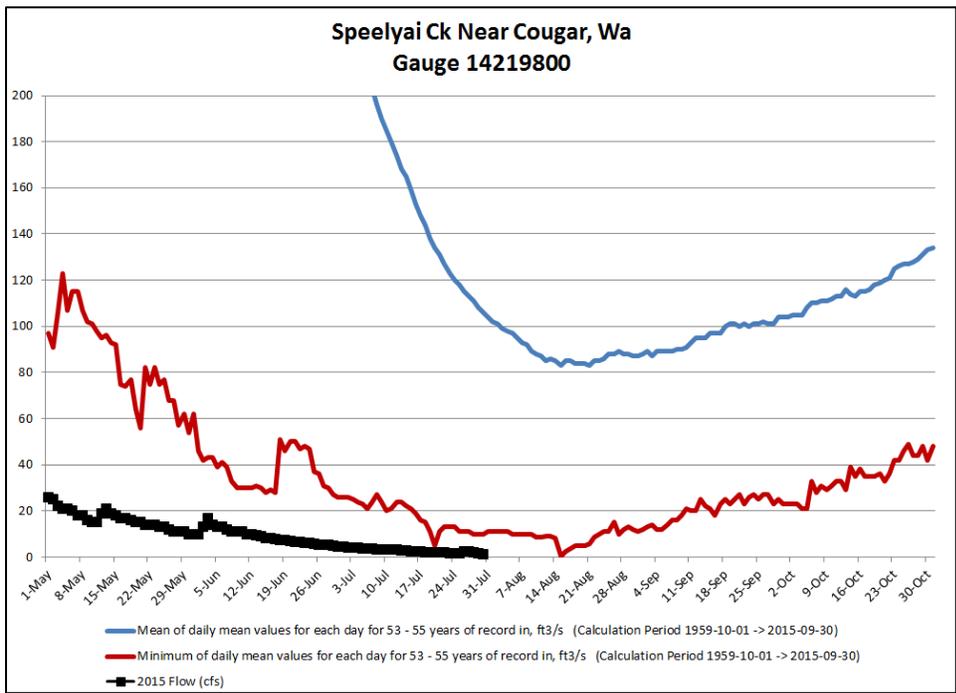
## Southwest Region

Staff in Region 5 are recording temperatures at seventeen sites in the south Cascades, southwest Washington, and the Columbia Gorge. These records will be extremely valuable as we apply what we've learned this year to next year's dry conditions.

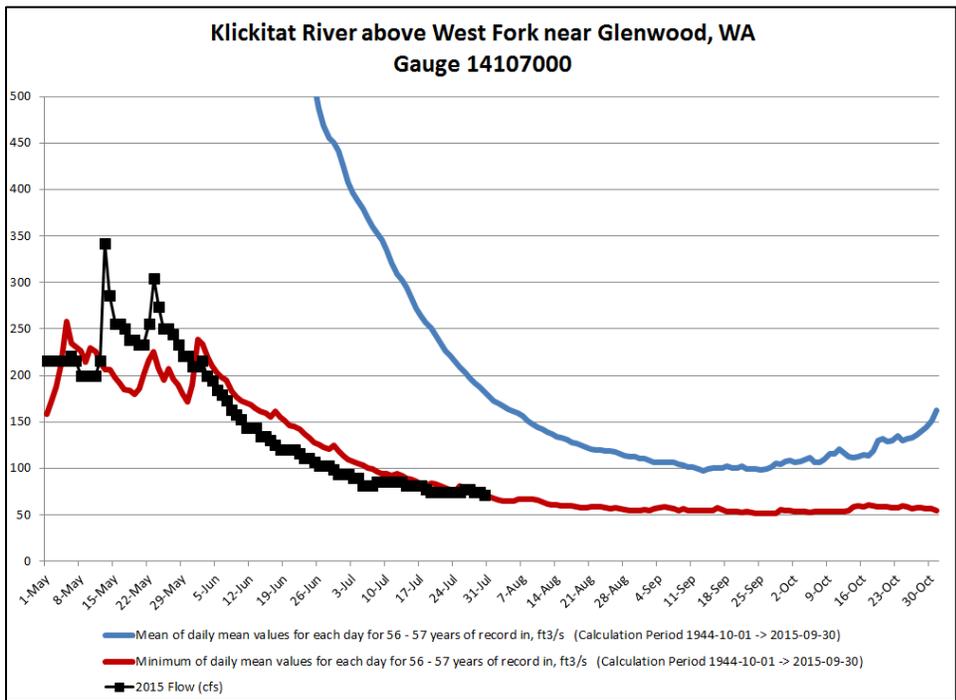
Naselle R continues to show record low flows.



Skelyai Creek rate of decline is slowing and total flow is down to 1.4 cfs.



Upper Klickitat seems to be bottoming out. Can anyone report what the lower river and tribs are like?



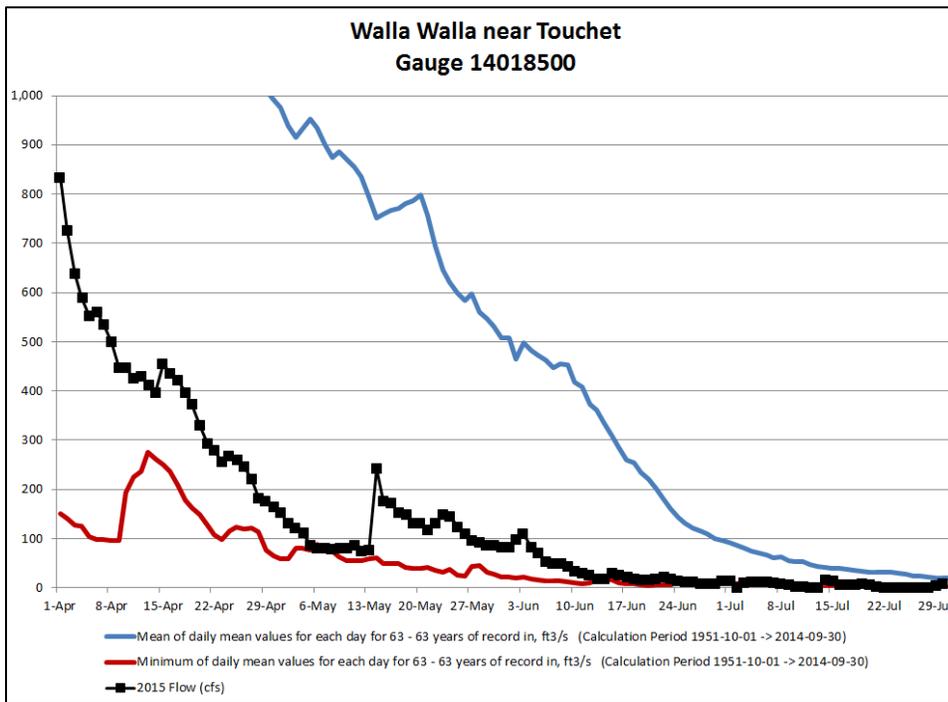
## Walla Walla Basin

Correspondent Eric Hartwig (Ecology) tells us the Walla Walla River went dry on Saturday July 25 at the USGS gauge below Touchet (right). A large amount of water is being diverted out of Mill Creek to fight the Blue Creek fire. Eric gives a cautionary note when looking at the gauges in the Walla Walla and Touchet because they are reading higher flows due to the increase of milfoil and other aquatic vegetation that is choking out river beds. The adjacent photo is at river mile 14 taken on Saturday the 25<sup>th</sup> and shows the Walla Walla down to the merest trickle.



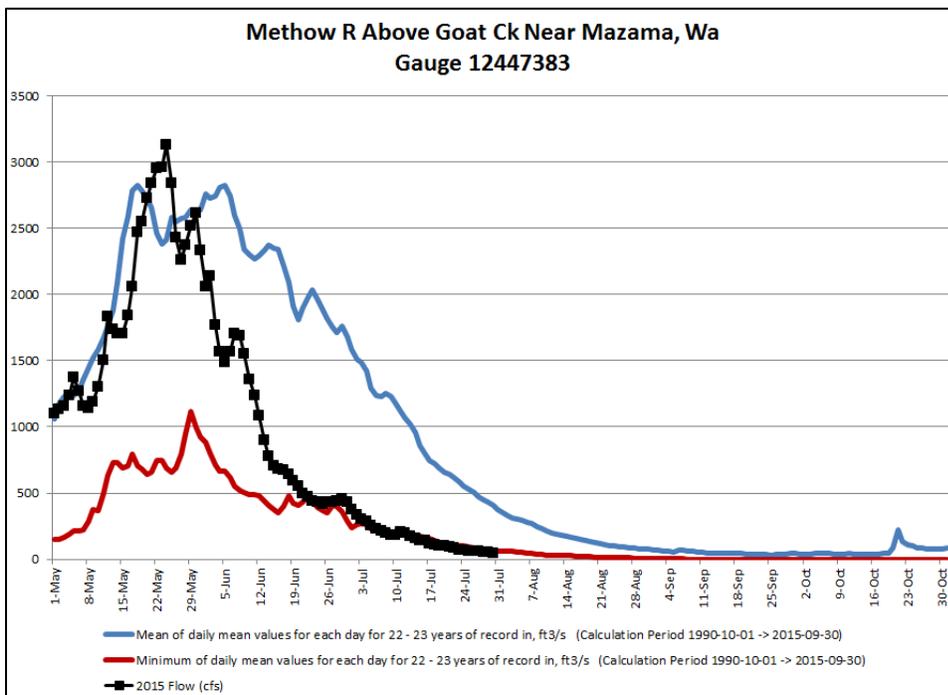
Eric did not see any true bone-dry spots but observed still water in a few spots. The USGS gauge below Touchet appears not to function below 0.02 cfs (9 Gallons per Minute). On Sunday the 26th both the USGS gauge below Touchet and the Ecology gauge at Cumming Rd on the Touchet both were reading 0 cfs. A few smaller creeks down in the Walla Walla are bone dry; the ones that have had the most complaints are Garrison Creek through College Place, Done Creek at the Whitman Mission, and the West Little Walla Walla. Stay tuned for more reporting from Eric!

This is our last week for tracking the Walla Walla. Flows are increasing as end-of July irrigation shutdown commences (or vegetation distorts gauge readings).

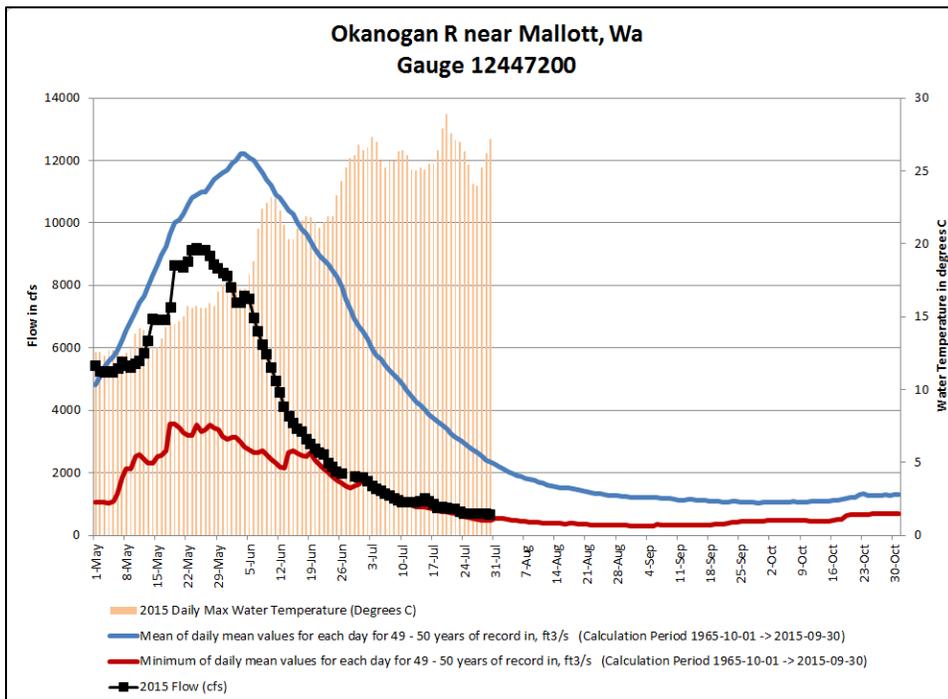


## North Central Washington

Methow is tracking with its historic low base flows. Staff are hoping to get water temperature data loggers installed in the Methow soon, and will be looking for volunteer help in collecting data from those units.

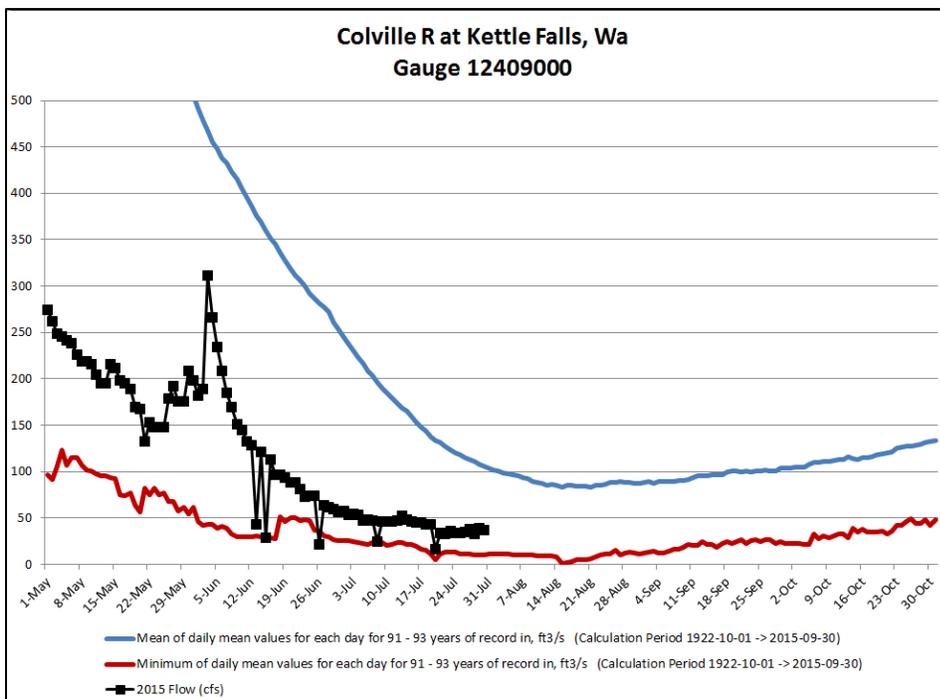


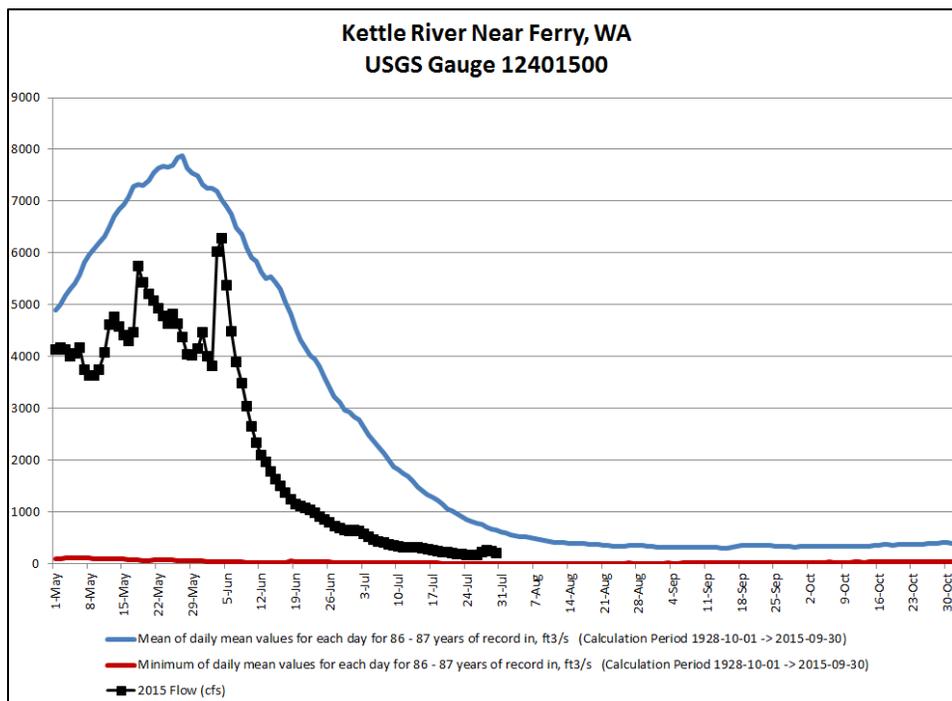
Okanogan is still hurting temperature-wise. Jeff Korth reported last week that some sockeye entered the river during the cooler temperatures, but likely got trapped when temperatures rose. Sockeye and chinook fishing is closed now in the Columbia River from Rocky Reach Dam to Chief Joseph Dam.



## Spokane and northeast Washington

Both Colville and Kettle are low and appear to be leveling off. Ecology tells us that the dips on the Colville are explained by three things: 1) some gaging error equipment error, which may contribute to the readings around June 12; 2) upstream withdrawals, which the early July readings look like; and the most important 3) the way they operate the Meyers Falls hydro plant, immediately upstream of the gage. Ecology's enforcement policy uses the 7-day average flows, which smooth out the effects of issues like these three and rainstorms, etc. (Guy Gregory, Ecology ERO).





Also from Ecology, Avista notified Ecology that on July 23, Avista reduced the Spokane River discharge from the Post Falls facility to 500 cfs. This change was triggered when Coeur d’Alene Lake dropped below the 24 hour rolling average of 2127.75 feet elevation. This reduction is in compliance with Avista’s Spokane River Project License, Appendix A, Section I.A.4.

## Snake & Columbia Rivers

Dworshak and Brownlee reservoirs (Snake River) drafted significantly last week: Dworshak elevation fell 6.7 feet, Brownlee 3.8. Dworshak contributes cool-water flows to the Snake. Outflows at Grand Coulee ranged from 79.4 Kcfs and 110 kcfs. Lake Roosevelt refilled 0.6 feet. Snake BiOp flow objectives are 50 Kcfs; actual flow averaged 29 Kcfs at Lower Granite last week. Columbia at McNary BiOp flow objective is 200 Kcfs; flows at McNary averaged 137-141Kcfs.

## White Sturgeon

Sturgeon die-offs started in late June/early July in several locations within the Columbia Basin, most noticeably between John Day and Priest Rapids dams on the Columbia River and in the lower Willamette River in Oregon. WDFW and Oregon Department of Fish and Wildlife staff and local law enforcement were able to confirm 100 sturgeon carcasses in these primary die-off areas (80 in reaches above Bonneville Dam and 20 in reaches and tributaries below Bonneville Dam). Over 80% of these die-offs were breeders (fish 55cm and larger fork length; “oversized”). Most of these were determined to be females in the process of resorption of eggs as a result of a failure to spawn.

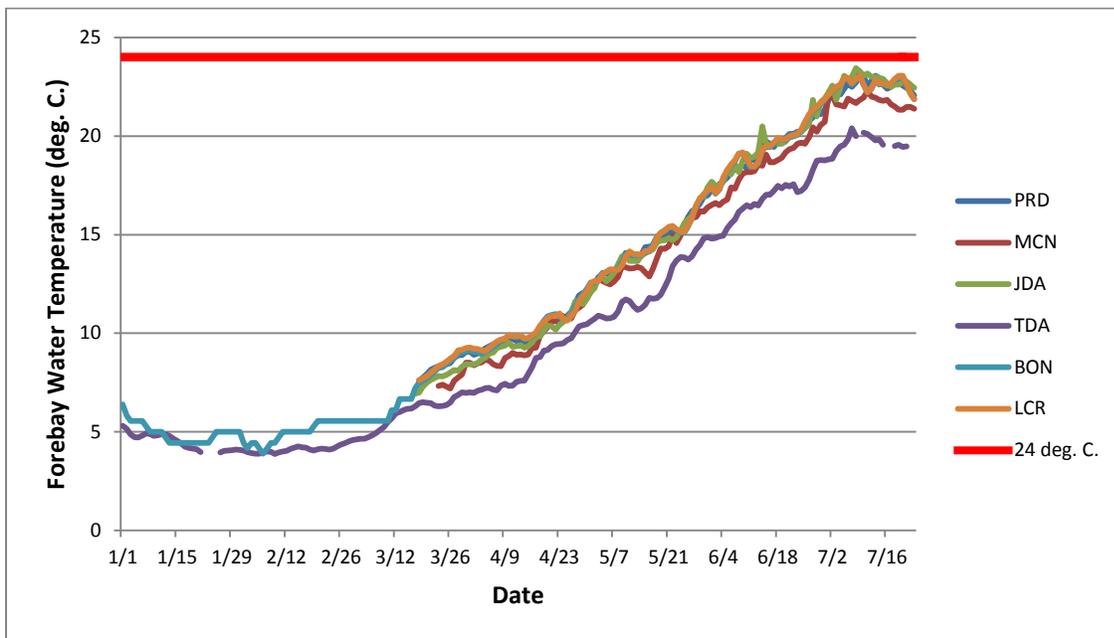
Total confirmed observations of sturgeon carcasses by state agency staff or local law enforcement has nearly doubled in the past two weeks in the area above Bonneville Dam. About 87% of the 167 fish observed were oversized. There have not been many sturgeon carcasses observed in Bonneville Pool, and subsequently the impact has been low (less than 1%) to the broodstock in that reservoir population. The impact to the broodstock component

of the populations in The Dalles and John Day reservoirs exceed 2% but still represent a small portion of breeders.

Water temperatures in the Columbia River have been well over the normal temperatures, which no doubt put extra stress on these fish. The large number of dead oversized sturgeon prompted regional fishery managers to close retention fisheries and the catch and release of sturgeon in the Columbia Basin waters upstream of Bonneville Dam effective Saturday July 18, 2015. The state agencies continue to monitor the area for additional die-offs, and where possible collect biological data from these fish to assess potential causes of death. (Olaf Langness)

### Water Temperatures

Water temperatures have dropped slightly in the past week as cooler weather developed. The figure below shows the water temperature in several of the Columbia River reservoirs. A red threshold line at 24 degrees Celsius is a value some groups have adopted as the trigger to cease all handling of white sturgeon.



Water temperatures recorded in the forebay of Priest Rapids (PRD), McNary (MCN), John Day (JDA), The Dalles (TDA), and Bonneville (BON) dams, and below Bonneville Dam (LCR).

### Priest Rapids Project

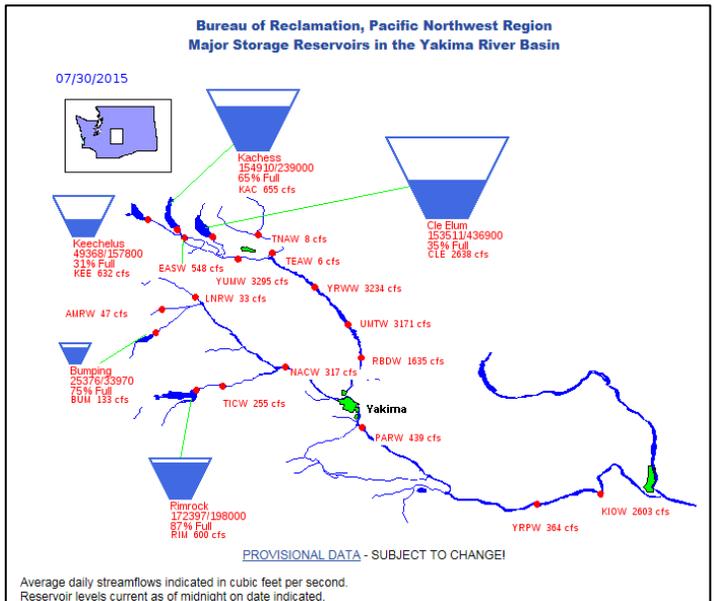
A juvenile bald eagle that fledged during late June was found dead at the Cove, within the Priest Rapids Project. The mortality likely occurred during early July. It is likely the bird died due to the lack of experience dealing with the high temperatures and lack of the ability to fly proficiently to take prey and/or change foraging behavior. The adults were not observed in the area. (Patrick Verhey)

## Yakima

The Reclamation Teacup Diagram (right) for Yakima Basin shows Lake Keechelus volume down to 31%, Kachess down to 65%, and Cle Elum down to 35%. Bumping is at 75% of full, and Rimrock is 87% full. Storage is 73.6% of average (1981-2010). Inflow to the five reservoirs is 41%, releases from the five are 83% and major canal diversions are 76% of average for July 31.

WDFW enforcement officers have been patrolling throughout the Yakima basin for fishing closures and the miscellaneous imprudence they regularly encounter. Officers Watts and Myers removed a rock dam last week from a channel of the Yakima (photo at right).

Mid-Columbia RFEF continues to lead and participate in fish rescue and recreational rock dam removal throughout the Yakima basin. Mid-C workers are also assisting WDFW and others to place short-term vegetative covering over pools in the Teanaway (“Teanaway Brush Bundle Project”). Cover includes cuttings from upland trees and will mimic beaver food caches. The cover will provide insulation from extreme high temperatures and create refuges for fish in this low-flowing river. (William Meyer)



Mike Ritter has been working on the problem of abundant water stargrass and other aquatic plants in the lower Yakima this year. Mike reports bank-to-bank and linear miles of aquatic plants choking the Yakima below Benton City (photo at Horn Rapids boat launch). Removal of this vegetation from critical locations will facilitate upstream passage of sockeye, summer chinook, and later, fall chinook and steelhead. Crews

will create and maintain narrow, upstream migration corridors in locations where vegetation is choking the thalweg; wholesale removal of these aquatic weeds would be near-impossible. Fall chinook spawning has already shifted from below Prosser to the Wapato Reach (Granger to Sunnyside Dam) in response to stargrass on the spawning riffles below Prosser...this began during the drought of 2001. The Mid-Columbia RFEF will be assisting WDFW with a targeted, surgical approach to remove stargrass so that fish can get upstream when the water temperature cools enough to allow entry from the Columbia. Work will begin the first week of August.

## Upper Basin streams

Jonathan Kohr of the Water Science Team provided a figure (right) showing the results of monitoring on Little Creek in the upper Yakima. This is one creek benefitting from the “water wheeling” project by Kittitas Reclamation District. Using information like this map, WDFW and partners can track progress and plan future operations for this project.



Correspondent Jim Matthews (Yakama Nation) reported on July 21 that meager flows (photos) were coming down the lower Teanaway mainstem (around 5 cfs or less according to the BOR and WDOE gages). The West and Middle Forks of the Teanaway also had little flow. Five

Flow Conditions in the Teanaway Drainage on 7-21-15



Photo 1- Mainstem Teanaway above Lambert Road (5.5 cfs).



Photo 2- Mainstem Teanaway below Red Bridge (4.7 cfs).



Photo 3- North Fork Teanaway at main road lower bridge.



Photo 4- Middle Fork Teanaway at lower bridge.

tributaries were dry near their mouths (Carlson, Lick, Dickey, Indian, Jack), and little more than a trickle was going down another two (Jungle and Middle). It is anticipated that the Teanaway mainstem and forks could be dry by the time we get to September. On a positive note, the upper North Fork and tributaries still have some flow coming down and may provide refugia for fish that made it up that high.

Gold Creek (Lake Keechelus tributary) is dewatered from the Gold Creek Pond outlet channel and upstream about 1.5 miles. Correspondent Cassandra Anderson (Bull Trout Task Force) encountered 17 fish entrapments while surveying this area (photo). The survey team recorded lat/long, took a temperature at the deepest part of each pond, identified fish species present, and salvaged fish with dip nets where it was possible. 33 young-of-year cutthroat and 4 young-of-year bull trout were successfully salvaged. A decision



was made to leave stranded adult bull trout in one of the larger ponds because the fish do not appear stressed, the pond is cool-groundwater influenced, and bank vegetation and overhang provide cover. Fish will be monitored, and if they become increasingly stressed, methods to rescue them will be considered. (Eric Anderson)



Photo at left: Scott Nicolai and Kelly Clayton of Yakama Nation tackle a rock dam on Big Creek near Ensign Ranch. Kelly reports a positive response from Ranch staff when they were asked to remove dams on the ranch and discourage further construction.

## WDFW Headquarters Drought Response Activity

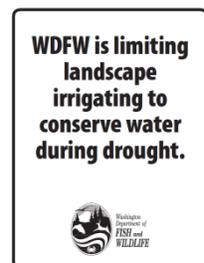
**Agency water use at all facilities:** On July 20, WDFW announced measures to be implemented at all facilities, hatcheries, wildlife areas, offices, labs, and shops. Signs are provided so the agency can communicate with the public about our water use restrictions and exceptions.

**Let 'em Pass Signs:** More of these signs are being printed; contact Angella Ward in the WDFW Habitat Program to receive to post. Remember to obtain landowner permission prior to any posting on public or private land.

**Low Flow Blockage Remediation Program and HPA:** Stay tuned for more on the WDFW Drought HPA and a process to consider low-flow blockage remediation projects, as well as ways to direct help to fish stranding and rock dam reports. WDFW will be working with WCC crews and volunteers (through NGO partners) to deploy drought responses – details to follow. Staff are encouraged to communicate with supervisors and regional program managers for news on the process for getting additional capacity to respond to drought issues.

Three WCC crews are assigned this week to help WDFW in Pierce and Thurston counties, and for work on the Dungeness. Again, stay tuned for more information on WCC crew assignments and potential help from local volunteer groups.

**Report your observations** – **THERE IS A REPORTING FORM ON SHAREPOINT** for reporting your looming, suspected, or real-time blockages, stranded fish, and drought-related fish die-offs.



The Drought 2015 sharepoint site is available under “Habitat” via the intranet sharepoint link. Alternatively, fill out the online form on the public WDFW drought page, or email Drought Coordinator Teresa Scott at [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov) . Coming soon: guidance for using your cell phone’s camera and GPS features to send photos of blockages that include GPS coordinates.

**Ecology Drought Relief Funds:** Drought funding is coming to WDFW through Ecology, and spending has already begun. Any questions staff has about WDFW’s drought funding can be directed to Drought Coordinator Scott. Ecology has also asked WDFW to work with tribal comanagers to fund drought projects.

### Drought-related Hatchery Actions through July 30

Region	Facility (Species)	Mortality (% production)	Comments
3	Naches		All fish have been moved off station to CBH. We are still hoping to get DOE approval on our applications so that the new well project continues to move forward. We have re-evaluated the re-use issues at Naches and we are now seeking to keep this project moving forward as well. .
4	Bellingham (Rainbow Trout)	0 this week 5,760 cum. (80% cum.)	Loss adjustment due to form error
4	Icy Creek (Coho)		No drought related mortality. 107,000, or 30%, of the population was planted into the Green River on 7/29. This was done because of a rapid decrease in available water at the facility; 60% reduction in available water in the last 3 weeks. Current flow at the facility is 1,700 gallons per minute.
4	Issaquah (Coho)	1,161 this week 6,728 cum. (1%) cum.	
4	Soos Creek (Summer Steelhead)	56 this week 41,208 cum. (60% cum.)	Loss adjustment due to form error.
4	Soos Creek (Coho)	107 this week 172,570 cum. (20% cum.)	Shipped 461,000 coho to Keta Creek Complex (Muckleshoot). Loss adjustment due to form error.
5	Grays River (Steelhead)	75,000 this week 145,000 cum. (91% cum.)	Formalin treatments have continued for 10 days but mortality has continued at a devastating rate.
5	Grays River (Chinook)		Frunculosis and formalin treatments on going with success. No significant losses.
5	Grays River (Coho)		450k type S Coho were moved to Cowlitz Trout Hatchery on July 28th and 29th. The reason for this move is diminishing flows in the West Fork Grays. No drought related mortalities
5	Lewis River (Chinook)		By Sat Aug. 1st the Lewis River will be dropped to 800 cfs from 1250 cfs in an attempt to keep Yale and Merwin reservoir full enough for fall adult spawning in the river below Merwin Dam. On Mon. Aug. 3rd 500k Spring Chinook will be released. This is ~38% of the Lewis Spring program . These fish were programed for an October release. Early smoltification and BKD have caused this early release to meet optimal fish health and river conditions. Otherwise no drought related mortalities.

5	Washougal (Coho)	0 this week 37,000 cum. (2% cum.)	Since an early epizootic of Columnaris fish have recovered to normal mortality levels.
6	Forks Creek (Steelhead)	3,739 this week 14,489 cum. (24% cum.)	Mortality due to ICH and is now dropping. Treating with formalin and salt.
6	Lake Aberdeen (Steelhead)	3,964 this week 64,989 cum. (22% cum.)	2 days of loss this week attributed to drought. Treating with salt in the afternoons when water temperatures exceed 70 degrees. Expecting a media visit on Monday for a piece on fish diseases.
6	Naselle (Steelhead)	74 new 64,989 cum. (22% cum.)	Mortality due to ICH and is now normal (not considered drought-related). Waiting for signs to continue treatment. Loss adjustment due to form error.
6	Naselle (Coho)	1,524 new 635,226 cum. (44% cum.)	Mortality in early July has now dropped to normal level. Loss adjustment due to form error
6	Sol Duc		Sand bags have been placed and water has successfully been diverted allowing for adequate pumping head and fish migration.
6	Voight's Creek (Coho)	0 new 347,000 cum. (44% cum.)	

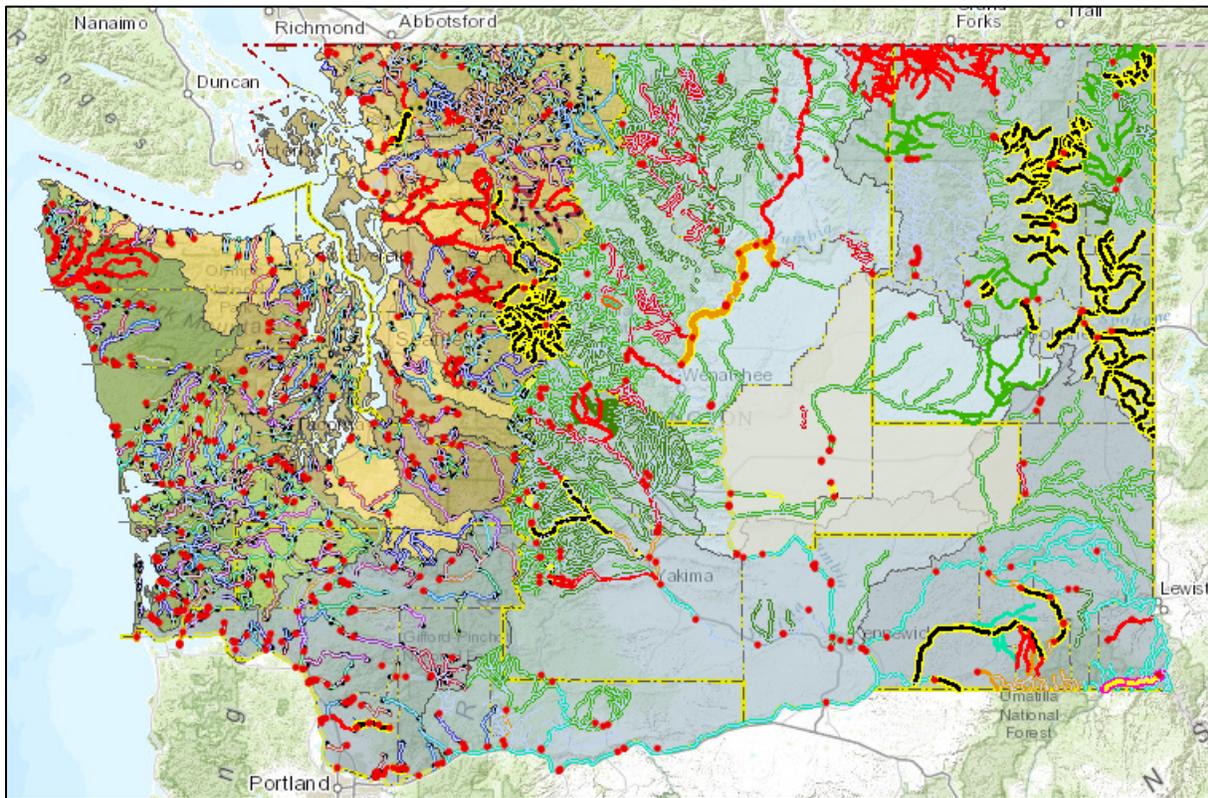
## Drought-related fishery actions through July 30

- Effective July 18: Sturgeon fisheries, including catch-and-release, closed Bonneville Dam upstream in the Columbia River, the lower Snake River, and adjacent tributaries.
- Effective July 18: "Hoot-Owl" restrictions put in place in 8 rivers in Region 1, 2 rivers in Region 3, 4 rivers in Region 4, and 2 rivers in Region 5.
- Trout, salmon, and steelhead fishery closures in table below (**new closures this week in bold red**):

Region	River	Current Fishery	Rule	Rationale
1	North Fork Touchet above Spangler Creek (7/18)	Trout	Closed	Extreme low flows. Protect adult spring Chinook and juvenile steelhead
1	South Fork Touchet (7/18)	Trout	Closed	
1	Wolf Fork (Touchet) (7/18)	Trout	Closed	
1	Asotin Creek and tributaries (7/18)	Trout	Closed	
1	Kettle River (7/18)	Redband Trout	Closed	Extreme low flows and high temperatures; reports of fish mortality. Protect redband trout.
2	Wenatchee River from mouth to Icicle River Road Bridge (7/18)	Spring Chinook	Closed	Low flow and high temperature; protect ESA-listed steelhead and Chinook; allow passage of sockeye to Lake Wenatchee for escapement.
2	Icicle River from mouth to 500' downstream of Leavenworth Hatchery (7/18)	Spring Chinook	Closed	Protect ESA-listed steelhead and Chinook.
2	Lake Wenatchee	<b>Sockeye</b>	<b>Closed to</b>	Harvestable numbers are

	<b>Open to sockeye (7/30)</b>		<b>Chinook, steelhead, bull trout.</b>	available while ensuring adequate sockeye spawners.
2	Columbia River from Rocky Reach Dam upstream to Chief Joseph Dam (7/27)	Summer Chinook, Sockeye, Gamefish	No Sockeye Retention	Ensure adequate sockeye spawners.
2	Okanogan River from the Hwy 97 bridge upstream to Zosel Dam (7/18)	Summer Chinook, Sockeye, Gamefish	Salmon Closed Gamefish Open	High temperature. Protect ESA- listed steelhead and wild summer Chinook
2	Similkameen River mouth upstream to Enloe Dam (7/18)	Summer Chinook, Sockeye	Closed	
3	Ahtanum Creek (7/18)	Trout	Closed	Extreme low flow and high temperature. Protect ESA-listed juvenile steelhead and ESA-listed bull trout.
3	Little Naches River (7/18)	Trout	Closed	Extreme low flow and high temperature. Protect isolated adult spring Chinook and ESA-listed juvenile steelhead.
3	Teanaway River (7/18)	Trout	Closed	Extreme low flow and high temperature. Protect isolated adult spring Chinook, ESA-listed bull trout, and ESA-listed juvenile steelhead.
4	Raging River (7/18)	Trout	Closed	Extreme low flow and high temperature. Protect ESA-listed juvenile steelhead.
4	Skykomish River (7/18)	Summer Steelhead, Trout	Closed, except Near Reiter Ponds Hatchery	Extreme low flow and high temperature. Protect isolated and concentrated ESA-listed adult Chinook, juvenile and adult steelhead.
4	Wallace River (7/18)	Trout	Closed	Extreme low flow and high temperature. Meet adult Chinook broodstock needs at hatchery.
4	Stillaguamish River upstream of Marine Drive (7/18)	Summer Steelhead, Trout	Closed	Extreme low flow and high temperature. Protect isolated and concentrated ESA-listed adult Chinook, juvenile and adult steelhead, and bull trout.
4	South Fork Nooksack (7/18)	Trout	Closed	Extreme low flow and high temperature. Protect isolated and concentrated ESA-listed adult Chinook, juvenile and adult steelhead, and bull trout
4	Buck, Downey, and Sulpher creeks (tributaries to Suiattle River) (7/18)	Trout	Closed	Extreme low flow. Protect isolated and concentrated ESA-listed adult Chinook,
5	East Fork Lewis River from Lewisville Park downstream	Steelhead, Trout	Closed	High temperature. Protect ESA-listed adult summer

	(7/18)			steelhead.
5	Washougal River from Mt. Norway Bridge downstream (7/18)	Steelhead, Trout	Closed	High temperature. Protect ESA-listed adult summer steelhead.
6	Bogachiel River (Clallam Co.) and all tributaries outside Olympic National Park (8/1)	All species	Closed	Low water and higher than normal water temperatures are causing a delay in migration and increased stress on wild salmon returning to the Quillayute system, making them more vulnerable to fishing pressure. The Quilleute Tribe has also closed its fishery for two weeks, and will re-assess the situation at that time. These closures are needed to protect wild Chinook and coho salmon.
6	Calawah River (Clallam Co.) and all tributaries outside Olympic National Park (8/1)	All species	Closed	
6	Dickey River (Clallam Co.) and all tributaries outside Olympic National Park	All species	Closed	
6	Sol Duc River (Clallam Co.) and all tributaries outside Olympic National Park (8/1)	All species	Closed	
6	Quillayute River (Clallam Co.) from the confluence of the Sol Duc and Bogachiel Rivers downstream 475 yards to fluorescent orange paint on rocks (8/1)	All species	Closed	



- DroughtStreamClosure
- No Drought Closure
  - Closed 2PM to Midnight
  - Totally Closed
  - Closed for Salmon
  - Closed for Sockeye
  - Closed to All but Sockeye

WDFW drought stream closures and restrictions as of July 30, 2015. Red dots represent locations of all emergency rules adopted in 2015. Drought closures and restrictions are symbolized per the legend at left.

## News Clips

July 31, 2015	<a href="#">‘Extreme drought’ hits Washington for first time in a decade</a>	Capital Press
July 31, 2015	<a href="#">Die-Off Sparks Questions About Sturgeon Survival In A Changing Climate</a>	NW Public Radio
July 31, 2015	<a href="#">Pre-Statehood Water Rights Curtailed In Yakima Basin, Tributaries Down To A Trickle</a>	Columbia Basin Fish & Wildlife Bulletin
July 31, 2015	<a href="#">The Drought and "The Blob" Delivering One-Two Punch To Puget Sound Ecosystems</a>	KPLU News for Seattle and the Northwest
July 30, 2015	<a href="#">Dungeness Water Users call for cut in irrigation water use</a>	Peninsula Daily News
July 30, 2015	<a href="#">As salmon vanish in the dry Pacific Northwest, so does Native heritage</a>	The Washington Post
July 30, 2015	<a href="#">‘The Blob’ warms Puget Sound’s waters, hurts marine life</a>	The Seattle Times
July 30, 2015	<a href="#">Seattle’s scorching summer sizzles on</a>	The Seattle Times
July 30, 2015	<a href="#">Warm water 'blob' invades Puget Sound</a>	KING5.com
July 30, 2015	<a href="#">Summer of 2015 could be the hottest on record</a>	Northwest Cable News
July 30, 2015	<a href="#">OUTDOORS: Fishing closes on West End rivers; chinook heating up off Sekiu</a>	Peninsula Daily News (AP)
July 30, 2015	<a href="#">North Olympic Peninsula rivers at historic low flows amid worsening drought</a>	Peninsula Daily News (AP)
July 30, 2015	<a href="#">Warm waters may lead to fishing restrictions in local streams, rivers</a>	Methow Valley News
July 30, 2015	<a href="#">Lake Washington sockeye run falls well below expectations, and attention now shifts to warm water survival</a>	The Seattle Times
July 30, 2015	<a href="#">Drought, Warm Waters Blocking Return of Skykomish, Tulalip Chinook</a>	Northwest Sportsman
July 30, 2015	<a href="#">So far so good for state fish hatcheries in Skagit County</a>	GoSkagit.com
July 30, 2015	<a href="#">Warm waters bring more restrictions on salmon fishing in Tulalip</a>	HeraldNet.com
July 30, 2015	<a href="#">In drought, conflict emerges between fish and man</a>	Crosscut
July 29, 2015	<a href="#">Seven Ways Drought is Impacting the Inland Northwest</a>	The Pacific Northwest Inlander
July 29, 2015	<a href="#">Officials alter flow of river to help salmon spawn</a>	KPLC 7 News
July 29, 2015	<a href="#">Some man-made rock dams being removed from area rivers</a>	KOMO-TV
July 28, 2015	<a href="#">100,000 fish die from drought at Green River hatchery</a>	The Daily News
July 28, 2015	<a href="#">WDFW Reports 1.5 Million Young Salmon, Steelhead Lost Due To Drought, Heat</a>	Northwest Sportsman
July 29, 2015	<a href="#">Drought forces managers to lower North Fork of Lewis River</a>	The Columbian
July 29, 2015	<a href="#">Hot Water Leaves Nearly 250,000 Salmon Dead In The Pacific Northwest</a>	ThinkProgress (D.C.)
July 28, 2015	<a href="#">Puget Sound waters reach record warm temperatures</a>	GoSkagit.com
July 28, 2015	<a href="#">UPDATE: Number of Sturgeon Dying Has Slowed, But Could Pick Up During Heat Wave</a>	NBC Right Now KNDO-TV
July 28, 2015	<a href="#">State diverts river to help salmon</a>	KING5.com
July 28, 2015	<a href="#">Lake Wenatchee Sockeye Season To Open Thurs., July 30</a>	Northwest Sportsman
July 28, 2015	<a href="#">Tacoma Water joins Seattle, Everett in water shortage plan</a>	News Tribune
July 27, 2015	<a href="#">Your IPAs are about to get a little more expensive</a>	Munchies.com
July 27, 2015	<a href="#">Nationwide hops shortage spells trouble for the US beer industry</a>	The Daily Meal.com
July 27, 2015	<a href="#">Seattle, Everett, Tacoma activate water shortage response plans</a>	KIRO-TV
July 27, 2015	<a href="#">Why are thousands of migratory salmon dying before they can spawn?</a>	Christian Science Monitor
July 27, 2015	<a href="#">Closures because of heat wave limiting, not ending fishing opportunities</a>	Yakima Herald Republic
July 27, 2015	<a href="#">Idaho Fish and Game working to save Snake River sockeye</a>	Northwest Cable News
July 27, 2015	<a href="#">Seattle, Everett, Tacoma urge water conservation in drought</a>	The Seattle Times
July 27, 2015	<a href="#">Worldwide strengthening El Nino giveth and taketh away</a>	Washington Post
July 27, 2015	<a href="#">Half of Columbia River sockeye salmon dying due to hot water</a>	Bellingham Herald
July 27, 2015	<a href="#">Emergency sockeye closure set for Sunday in Upper Columbia</a>	Spokesman Review
July 26, 2015	<a href="#">Stillaguamish River, threatened fish species weather silt, slides and drought</a>	HeraldNet.com
July 25, 2015	<a href="#">Snowpack Drought Has Salmon Dying in Overheated Rivers</a>	Seattle Times

July 24, 2015	<a href="#">Irrigation ends in some Yakima tributaries</a>	Capital Press
July 24, 2015	<a href="#">Some Yakima Valley farmers told to stop watering</a>	Yakima Herald Republic
July 24, 2015	<a href="#">Upper Columbia Sockeye Fishery Could Close; Half The Run May Have Died</a>	NW Sportsman
July 23, 2015	<a href="#">NOAA grant to help Washington monitor toxic algae bloom</a>	MyNorthwest.com
July 24, 2015	<a href="#">No relief in sight for parched West</a>	Capital Press
July 23, 2015	<a href="#">OUTDOORS: Pinks massing around Port Angeles; Area 9 (Admiralty Inlet) to close at end of day Sunday</a>	Peninsula Daily News (AP)
July 23, 2015	<a href="#">Lake Wenatchee sockeye season delayed</a>	HeraldNet.com
July 23, 2015	<a href="#">Drought, Irrigation Failure Take Toll On Washington Capitol Campus</a>	NW Public Radio
July 23, 2015	<a href="#">Hatchery salmon trucked to cooler water</a>	Spokesman Review
July 23, 2015	<a href="#">Officials warn ultra-dry region is rife with tinder for brush fires</a>	Seattle Times
July 22, 2015	<a href="#">Heat wave, low snow pack wreaking havoc on fish hatcheries</a>	KOMO News
July 22, 2015	<a href="#">No plans for fishing restrictions in Idaho despite heat</a>	Moscow-Pullman Daily News
July 22, 2015	<a href="#">Salmon to spawn traffic tie-ups for years</a>	King5.com
July 22, 2015	<a href="#">Columbia River summer chinook return stands as largest since at least 1960</a>	The Seattle Times
July 22, 2015	<a href="#">Washington Fire Chiefs Say Wildfires Could Scorch Any City</a>	NPR
July 22, 2015	<a href="#">El Niño intensifying, could rival strongest in recorded history</a>	Washington Post
July 22, 2015	<a href="#">WA wildfires cost nearly \$35 million so far this year</a>	Northwest Cable News
July 22, 2015	<a href="#">Northwest Drought Dispatches Firefighters To More Wildfires</a>	NW Public Radio
July 22, 2015	<a href="#">Hatchery fish moved to Little White Salmon site</a>	The Columbian
July 21, 2015	<a href="#">Trout In Drought: 'You Almost Feel Sorry For The Fish'</a>	Kuow
July 21, 2015	<a href="#">Breeding-age sturgeon dying, possibly due to heat</a>	Chinook Observer
July 21, 2015	<a href="#">'Severe drought' stirs rare concerns in Pacific County</a>	Chinook Observer
July 21, 2015	<a href="#">Time for personal and agency action to save birds: Drought is hammering migratory species and wetlands</a>	Chinook Observer
July 21, 2015	<a href="#">Pink Salmon Wave Builds Off Sekiu</a>	NW Sportsman
July 20, 2015	<a href="#">Lack of water could temporarily shut down Port Townsend Paper Corp. mill</a>	Peninsula Daily News
July 20, 2015	<a href="#">Drought dings quality of winter wheat in Northwest</a>	Washington Post (AP)
July 20, 2015	<a href="#">Fish Could Run Into "Hot Water" While Migrating in the Yakima River</a>	NBC Right Now KNDU-TV
July 20, 2015	<a href="#">Northern Puget Sound hatchery king fishery at midway point of catch quota in just three days of fishing</a>	The Seattle Times
July 20, 2015	<a href="#">Where And What You Can Still Fish For In The Northwest</a>	NW Sportsman
July 20, 2015	<a href="#">A Photographic Survey Of Low Waters On The Skykomish System</a>	NW Sportsman
July 20, 2015	<a href="#">Sockeye salmon suffer infections in warm Columbia River system</a>	Spokesman Review
July 19, 2015	<a href="#">Drought raises concern over return of humpies</a>	HeraldNet.com
July 18, 2015	<a href="#">Experts: No end in sight for Washington's historic drought</a>	KOMO News
July 18, 2015	<a href="#">Biologists haul sockeye on trucks to avoid unusually warm Northwest rivers</a>	OregonLive.com
July 18, 2015	<a href="#">Community Conversation: Accurate use data needed to resolve Whatcom water issues</a>	The Bellingham Herald
July 18, 2015	<a href="#">Fishing in 30 state rivers idled by drought</a>	HeraldNet.com
July 17, 2015	<a href="#">Heat-Stressed Large Sturgeon Dying; States Close Sturgeon Fishing From Bonneville Dam To Mid-Columbia</a>	Columbia Basin Fish and Wildlife Bulletin
July 16, 2015	<a href="#">The rise and fall of the American lawn, at least in California</a>	Washington Post

[Rich Landers Outdoors Blog](#)

Spokesman Review – ongoing

[Concerns mount as drought deepens](#)

Columbian Special Project July 11, 2015

## ***Links***

### [Ecology's "Washington Drought 2015"](#)

Ecology Dam Safety web page [Wildfire Impacts on Dams](#)

Washington State Climatologist [weekly drought update for Washington State](#).

Drought web pages for State departments of [Health](#) and [Agriculture](#)

National Integrated Drought Information System [Pacific Northwest Drought Portal](#)

NOAA [El Nino Portal](#)

[NOAA's Climate Prediction Center](#)

[Northwest River Forecast Center Water Supply](#)

USGS [Real time stream data for Washington](#)

U.S. Army Corps of Engineers [Seattle District Reservoir Control Center](#)

## ***For Further Information:***

Drought-related staff resources are available on the "S" drive (All agency, shared projects) and WDFW SharePoint under Habitat Program, Drought 2015.

Contact WDFW Drought Coordinator Teresa Scott at [teresa.scott@dfw.wa.gov](mailto:teresa.scott@dfw.wa.gov) or (360) 902-2713 with questions and suggestions.

## ***Hydrograph Sampler Chart Links***

Nooksack @ Ferndale	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12213100">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12213100</a></u>
Skagit near Concrete	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12194000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12194000</a></u>
Stilly	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12167000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12167000</a></u>
Issaquah	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12121600">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12121600</a></u>
Dungeness	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12048000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12048000</a></u>
Hoko	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12043300">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12043300</a></u>
Calawah	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12043000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12043000</a></u>
Skookumchuck	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12025700">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12025700</a></u>
Naselle	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12010000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12010000</a></u>
Speelyai	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=14219800">http://waterdata.usgs.gov/wa/nwis/uv?site_no=14219800</a></u>
Klickitat	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=14107000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=14107000</a></u>
Wenatchee @ Monitor	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12462500">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12462500</a></u>
Walla Walla	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=14018500">http://waterdata.usgs.gov/wa/nwis/uv?site_no=14018500</a></u>
Methow	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447383">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447383</a></u>
Okanogan	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447200">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12447200</a></u>
Colville	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12409000">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12409000</a></u>
Kettle	<u><a href="http://waterdata.usgs.gov/wa/nwis/uv?site_no=12401500">http://waterdata.usgs.gov/wa/nwis/uv?site_no=12401500</a></u>

Alan, I promise a Nooksack chart next week. I'm also planning to add a Skagit gauge, Chehalis, and Wenatchee.